Vol. 1079 Number 3

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of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

June 16, 1987

U.S.
DEPARTMENT
OF COMMERCE

Patent
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OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

June 16, 1987 Volume 1079 Number 3

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $6.00 each; copies of TRADEMARKS at $1.00 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Apr. 1, 1987 and was announced in the *Official Gazette* at 1077 O.G. 3 on Apr. 7, 1987.

International PCT fees were changed due to differences in the exchange rate effective Nov. 1, 1986 and were announced in the *Official Gazette* at 1071 O.G. 22 on Oct. 21, 1986.

Schedule of current PCT fees effective Apr. 1, 1987

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority	
—No corresponding prior U.S. national application filed:	420.00
—Corresponding prior U.S. national application filed:	250.00
European Patent Office as Searching Authority	
If paid before Apr. 1, 1987:	1015.00
If paid on or after Apr. 1, 1987:	1180.00
International fees	
Basic fee (first 30 pages):	430.00
Basic Supplemental fee (for each page over 30):	8.00
Designation fee for the first 10 national or regional offices:	105.00
Designation fee for 11th and subsequent designations:	No charge

DONALD J. QUIGG,
Mar. 23, 1987. *Assistant Secretary and Commissioner of Patents and Trademarks.*

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on June 12, 1984, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,453,271 through 4,454,610
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:
By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:
By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98–622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED MARCH 29, 1987, DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,377,876,	06/243,473	3/29/83
4,377,879	06/333,564	3/29/83
4,377,884	06/287,997	3/29/83
4,377,885	06/267,655	3/29/83
4,377,909	06/235,717	3/29/83
4,377,910	06/271,567	3/29/83
4,377,913	06/226,644	3/29/83
4,377,915	06/265,055	3/29/83
4,377,916	06/285,009	3/29/83
4,377,918	06/228,004	3/29/83
4,377,937	06/299,251	3/29/83
4,377,949	06/246,777	3/29/83
4,377,958	06/250,269	3/29/83
4,377,964	06/289,313	3/29/83
4,377,968	06/223,324	3/29/83
4,377,970	06/286,259	3/29/83
4,377,972	06/250,861	3/29/83
4,377,973	06/263,622	3/29/83
4,377,975	06/264,260	3/29/83
4,377,979	06/249,397	3/29/83
4,377,996	06/233,650	3/29/83
4,378,003	06/225,816	3/29/83
4,378,006	06/254,717	3/29/83
4,378,007	06/267,543	3/29/83
4,378,010	06/252,896	3/29/83
4,378,015	06/332,976	3/29/83
4,378,026	06/273,043	3/29/83
4,378,036	06/218,523	3/29/83
4,378,037	06/224,177	3/29/83
4,378,045	06/268,625	3/29/83
4,378,056	06/304,659	3/29/83
4,378,068	06/261,664	3/29/83
4,378,089	06/237,644	3/29/83
4,378,114	06/267,683	3/29/83
4,378,115	06/230,745	3/29/83
4,378,116	06/289,192	3/29/83
4,378,117	06/289,193	3/29/83
4,378,121	06/225,862	3/29/83
4,378,148	06/294,166	3/29/83
4,378,212	06/304,061	3/29/83
4,378,214	06/343,205	3/29/83
4,378,215	06/272,514	3/29/83
4,378,217	06/293,092	3/29/83
4,378,225	06/229,636	3/29/83
4,378,237	06/239,879	3/29/83
4,378,245	06/271,084	3/29/83
4,378,248	06/279,206	3/29/83
4,378,253	06/284,593	3/29/83
4,378,268	06/226,416	3/29/83
4,378,272	06/276,769	3/29/83
4,378,290	06/283,061	3/29/83
4,378,318	06/283,667	3/29/83
4,378,321	06/352,674	3/29/83
4,378,337	06/383,701	3/29/83
4,378,341	06/259,966	3/29/83
4,378,355	06/289,143	3/29/83
4,378,358	06/279,455	3/29/83
4,378,369	06/308,269	3/29/83
4,378,371	06/222,194	3/29/83
4,378,373	06/255,430	3/29/83
4,378,378	06/257,971	3/29/83
4,378,392	06/325,877	3/29/83
4,378,399	06/225,751	3/29/83
4,378,438	06/316,327	3/29/83
4,378,446	06/266,486	3/29/83
4,378,457	06/328,993	3/29/83
4,378,464	06/238,194	3/29/83
4,378,476	06/217,607	3/29/83
4,378,485	06/344,852	3/29/83
4,378,486	06/220,688	3/29/83
4,378,491	06/228,609	3/29/83
4,378,501	06/222,287	3/29/83
4,378,522	06/261,165	3/29/83
4,378,537	06/256,410	3/29/83
4,378,546	06/235,565	3/29/83
4,378,548	06/246,651	3/29/83
4,378,553	06/243,294	3/29/83
4,378,555	06/306,023	3/29/83
4,378,561	06/225,444	3/29/83
4,378,572	06/229,951	3/29/83
4,378,578	06/224,763	3/29/83
4,378,580	06/320,415	3/29/83
4,378,585	06/233,695	3/29/83
4,378,586	06/235,677	3/29/83

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,417,226, Re. S.N. 039,541, Filed Apr. 17, 1987, Cl. 337/225, SUBMINIATURE FUSE, Leon Gurevich, et al., Owner of Record: *Cooper Industries, Inc., Houston, Tex.,* Attorney or Agent: Nelson A. Blish, et al., Ex. Gp.: 216

4,503,329, Re. S.N. 022,059, Filed Mar. 5, 1987, Cl. 250/309, ION BEAM PROCESSING APPARATUS AND METHOD OF CORRECTING MASK DEFECTS, Hiroshi Yamaguchi, et al., Owner of Record: *Hitachi, Ltd., Tokyo, Japan,* Attorney or Agent: Donald R. Antonelli, et al., Ex. Gp.: 256

4,514,422, Re. S.N. 041,573, Filed Apr. 22, 1987, Cl. 426/3, NON-STALING GUM COMPOSITION AND METHOD OF PREPARATION, Robert Yang, et al., Owner of Record: *Warner-Lambert Co., Morris Plains, N.J.,* Attorney or Agent: Stephen Raines, et al., Ex. Gp.: 132

4,515,421, Re. S.N. 042,900, Filed Apr. 27, 1987, Cl. 312/351, MULTIPLE USE SHELF FOR COOLER, William J. Steffes, Owner of Record: *Coleman Co., Inc., Wichita, Kans.,* Attorney or Agent: Timothy L. Tilton, et al., Ex. Gp.: 357

4,579,024, Re. S.N. 041,061, Filed Apr. 22, 1987, Cl. 81/470, POWER TONGS AND CONTROL SYSTEM, William E. Coyle, Sr., Owner of Record: *Bilco Tools, Inc., Houma, La.,* Attorney or Agent: Charles W. Fallow, et al., Ex. Gp.: 323

4,585,123, Re. S.N. 040,380, Filed Apr. 20, 1987, Cl. 206/153, STATUS-DISPLAYING DEVICE FOR VIDEO TAPE STORAGE JACKETS, Verlyn M. Penry, Owner of Record: *Inventor,* Attorney or Agent: Daniel P. Chernoff, et al., Ex. Gp.: 241

4,589,506, Re. S.N. 043,860, Filed Apr. 28, 1987, Cl. 177/25, COMBINATION WEIGHING SYSTEM, Takashi Hirano, Owner of Record: *Yamato Scale Co., Ltd., Hyogo-Ken, Japan,* Attorney or Agent: Irving Powers, et al., Ex. Gp.: 216

4,652,438, Re. S.N. 041,960, Filed Apr. 27, 1987, Cl. 423/489, CHEMICAL VAPOR PURIFICATION OF FLUORIDES, Robert C. Folweiler, Owner of Record: *GTE Laboratories, Inc., Waltham, Mass.,* Attorney or Agent: Frances P. Craig, Ex. Gp.: 113

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the

requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

No Publications This Issue.

Department of the Treasury
United States Custom Service
(T.D. 87-67)

Recordation of Trade Name: "SNYDER LABORATORIES, INC."
Agency: U.S. Customs Service, Department of the Treasury
Action: Notice of Recordation
Summary: On Feb. 23, 1987, a notice of application for the recordation under section 42 of the Act of July 5, 1946, as amended (15 U.S.C. 1124), of the trade name "SNYDER LABORATORIES, INC." was published in the Federal Register (52 FR 5517). The notice advised that before final action is taken on the application, consideration will be given to any relevant data, views, or arguments submitted in writing by any person in opposition to the recordation and received not later than Apr. 24, 1987. No responses were received in opposition to the notice.

Accordingly, as provided in section 133.14, Customs Regulations (19 CFR 133.14), the name "SNYDER LABORATORIES, INC." is recorded as the trade name used by Snyder Laboratories, Inc., a corporation organized under the laws of the State of Delaware, located at 200 W. Ohio Ave., Dover, Ohio 44622. The trade name is used in connection with the developing and marketing of medical devices and equipment, including wound drainage devices and any parts, developments, extensions and accessories, including tubing, sterile needles and sterile connectors, manufactured in the United States.
Date: May 12, 1987.
For Further Information Contact: Harriet Lane, Entry, Licensing and Restricted Merchandise Branch, 1301 Constitution Ave., NW., Washington, D.C. 20229 (202-566-5765).

STEVEN PINTER,
Chief, Entry,
Licensing and Restricted Merchandise Branch.

May 7, 1987.

PATENT NOTICES

Certificates of Correction for the Week of June 16, 1987

Re. 31,731	4,609,542	4,628,181	4,642,634
Re. 32,364	4,609,627	4,628,310	4,642,728
D. 287,977	4,610,040	4,628,989	4,642,870
4,429,097	4,610,215	4,629,864	4,644,721
4,435,201	4,611,112	4,631,556	4,646,080
4,519,712	4,612,897	4,631,649	4,646,119
4,520,452	4,612,928	4,632,660	4,646,237
4,531,520	4,613,308	4,633,190	4,646,277
4,532,943	4,613,587	4,633,785	4,646,533
4,541,362	4,614,695	4,633,835	4,646,656
4,543,040	4,615,681	4,634,150	4,646,679
4,547,314	4,615,849	4,634,888	4,646,738
4,567,681	4,615,941	4,635,216	4,646,754
4,568,113	4,616,018	4,635,225	4,647,245
4,569,138	4,616,725	4,635,454	4,647,392
4,572,114	4,616,970	4,635,461	4,647,418
4,572,753	4,618,071	4,635,677	4,647,872
4,573,431	4,618,191	4,635,722	4,647,978
4,577,405	4,618,384	4,636,415	4,648,291
4,578,806	4,618,594	4,636,740	4,648,417
4,581,318	4,618,891	4,636,810	4,648,795
4,585,471	4,620,028	4,636,844	4,649,018
4,585,760	4,620,199	4,637,013	4,649,107
4,590,560	4,621,339	4,637,296	4,649,117
4,590,603	4,621,483	4,637,998	4,649,135
4,591,321	4,622,365	4,638,103	4,649,258
4,592,201	4,623,286	4,638,339	4,649,323
4,592,698	4,623,362	4,638,853	4,649,606
4,592,787	4,623,363	4,638,858	4,649,912
4,593,705	4,623,527	4,638,921	4,650,812
4,596,369	4,624,195	4,639,223	4,651,068
4,598,132	4,624,269	4,639,255	4,651,124
4,598,569	4,625,038	4,639,608	4,651,895
4,599,537	4,625,517	4,639,653	4,652,274
4,600,399	4,625,555	4,640,694	4,653,038
4,601,756	4,626,082	4,641,073	4,654,757
4,603,887	4,626,434	4,641,183	4,655,247
4,604,564	4,626,487	4,641,248	4,655,317
4,606,737	4,627,465	4,641,540	4,655,616
4,607,988	4,627,658	4,642,198	
4,608,844	4,628,015	4,642,278	

Disclaimers

4,174,038.—*Philip C. Whiting, Jr.*, Holyoke, Mass. PACKAGE FOR PHOTOGRAPHIC FILM AND MATERIAL AND POWDERS FOR MAKING SAME. Patent dated Nov. 13, 1979. Disclaimer filed Apr. 23, 1987, by the assignee, *Ludlow Corp.*

Hereby enters this disclaimer to all claims of said patent.

4,206,280.—*Harald Gallati*, Arlesheim and *Marc Roth*, Geneva, Switzerland. DETERMINATION OF ACID PHOSPHATASE. Patent dated June 3, 1980. Disclaimer filed Dec. 11, 1986, by the assignee, *Hoffmann-La Roche Inc.*

Hereby enters this disclaimer to all claims of said patent.

4,268,531.—*Philip C. Whiting, Jr.*, Holyoke, Mass. CONDIMENT PACKAGE AND MATERIAL FOR MAKING SAME. Patent dated May 19, 1981. Disclaimer filed Apr. 23, 1987, by the assignee, *Ludlow Corp.*

Hereby enters this disclaimer to all claims of said patent.

4,489,474.—*Paul R. Brown*, Tallmadge and *Henry D. Fresch*, Cuyahoga Falls, Ohio. ASSEMBLING METHOD OF ROLLING LOBE AIRSPRING. Patent dated Dec. 25, 1984. Disclaimer filed Apr. 6, 1987, by the assignee, *The Goodyear Tire & Rubber Co.*

Hereby enters this disclaimer to claims 1 and 3 of said patent.

4,502,193.—*Raymond E. Harmon*, Tustin; and *Lloyd R. Poe*, Long Beach, Calif. STAND-OFF FASTENER. Patent dated Mar. 5, 1986. Disclaimer filed Apr. 24, 1987, by the assignee, *Hartwell Corp.*

Hereby disclaims the entire term of said patent to the Public.

4,626,487.—*Yasuo Mitsuhashi*, Yokohama; *Masaki Uchiyama*; *Kazunori Murakawa*, both of Tokyo; *Kenji Okado*, Yokohama, all of Japan. PARTICULATE DEVELOPER CONTAINING INORGANIC SCRAPER PARTICLES AND IMAGE FORMING METHOD USING THE SAME. Patent dated Dec. 2, 1986. Disclaimer filed Feb. 13, 1987, by the assignee, *Canon Kabushiki Kaisha.*

Hereby enters this disclaimer to claims 1, 2, 3, 6, 7, 8, 9, 13 and 15 of said patent.

4,642,743.—*Jerry K. Radcliffe*, Owego, N.Y. POWER SUPPLIES WITH MAGNETIC AMPLIFIER VOLTAGE REGULATION. Patent dated Feb. 10, 1987. Disclaimer filed Apr. 22, 1987, by the assignee, *International Business Machines Corp.*

Hereby enters this disclaimer to claims 1–8 and 12 of said patent.

Dedication

Des. 287,031.—*Robert J. Cunitz*, Rockville, Md. NO DIVING SIGN. Patent dated Dec. 2, 1986. Dedication filed Apr. 20, 1987, by the *inventor.*

Hereby dedicates to the Public the entire term of said patent.

Disclaimer and Dedication

4,581,780.—*Jeffrey L. Hoskins* and *Gregory L. Hoskins*, both of Blackfoot, Id. PRECAST CONCRETE TOILET WITH VENT. Patent dated Apr. 15, 1986. Disclaimer and Dedication filed Apr. 27, 1987, by the *inventors.*

Hereby disclaims and dedicates to the Public the entire term of said patent.

DEPARTMENT OF COMMERCE

Patent and Trademark Office

37 CFR Part 1

[Docket No. 61231-7086]

Unity of Invention and Patent Cooperation Treaty [Chapter II]

AGENCY: Patent and Trademark Office, Commerce.

ACTION: Notice of Final Rulemaking.

SUMMARY: The Patent and Trademark Office hereby amends its regulations (1) to change the practice in handling unity of invention issues in international applications under the Patent Cooperation Treaty (PCT) and those entering the national stage under 35 U.S.C. 371 and (2) to establish procedures necessary for patent applicants to proceed under Chapter II of the Patent Cooperation Treaty. This rule change is being made because (1) the current rules for handling unity of invention issues in international applications are not consistent with the court decision in *Caterpillar Tractor Co.* v. *Commissioner of Patents and Trademarks*, 231 USPQ 590 (E.D. Va. 1986), and (2) legislation implementing Chapter II of the Patent Cooperation Treaty has recently been enacted. The promulgated rules will result in (1) the treatment of unity of invention issues in international applications consistently with the court decision while retaining the current practice for national applications filed under 35 U.S.C. 111, and (2) procedures adequate for applicants to proceed under Chapter II of the Patent Cooperation Treaty.

EFFECTIVE DATE: July 1, 1987.

FOR FURTHER INFORMATION CONTACT: Louis O. Maassel by telephone at (703) 557-3070 or by mail marked to his attention and addressed to the Commissioner of Patents and Trademarks, Washington, DC 20231.

SUPPLEMENTARY INFORMATION: This final rule change relates to (1) questions of unity of invention which may arise in international applications when searched as an International Searching Authority and when examined as an International Preliminary Examining Authority by the United States Patent and Trademark Office (USPTO) and during the national stage in the United States as a Designated Office after entry under 35 U.S.C. 371 pursuant to the Patent Cooperation Treaty (PCT) and (2) procedures to be followed and fees to be paid under Chapter II of the Patent Cooperation Treaty. The rule change will also increase the amount of the international search fees and national fees in international applications in view of increased average effort required by the USPTO because of changes in the rules relating to unity of invention. No fees are being established under 35 U.S.C. 41.

Background Information

Unity of Invention

The May 28, 1986, decision in *Caterpillar Tractor Company* v. *Commissioner of Patents and Trademarks*, 231 USPQ 590 (E.D. Va., 1986) held that the Patent and Trademark Office interpretation of 37 CFR 1.141(b)(2) as applied to unity of invention determinations in international applications was not in accordance with the Patent Cooperation Treaty and its implementing rules. In the Caterpillar international application, the USPTO, acting as an International Searching Authority, had held lack of unity of invention between a set of claims directed to a process for forming a sprocket and a set of claims drawn to an apparatus (die) for forging a sprocket. The court stated that it was an unreasonable interpretation to say that the expression "specifically designed" as found in PCT Rule 13.2(ii) means that the process and apparatus have unity of invention if they can only be used with each other, as set forth in the Manual of Patent Examining Procedure (MPEP) § 806.05(e).

Therefore, when the Patent and Trademark Office considers international applications as an International Searching Authority, as an International Preliminary Examining Authority, and during the national stage as a Designated or Elected Office under 35 U.S.C. 371, PCT Rule 13.1 and 13.2 will be followed when considering unity of invention of claims of different categories without regard to the practice in national applications filed under 35 U.S.C. 111. No change is being made in the current restriction practice in United States national applications filed under 35 U.S.C. 111 outside the PCT. No change in practice is being made in regard to claims of the same category of invention either in PCT international applications or in U.S. national applications. Any such change in U.S. national restriction practice would require a statutory change in the fee levels in order to cover the additional examining effort required in individual patent applications.

The unity of invention procedures set forth in the rules are already being substantially followed by the examiners in the USPTO as a result of the notice signed on August 15, 1986, and published in the Official Gazette on September 9, 1986 at 1070 O.G. 11. The notice of September 9, 1986 and any prior notices or policies relating to unity of invention which are inconsistent with the rules and procedures in this final rules notice are superseded to the extent that they are inconsistent.

The unity of invention practice set forth in PCT Rule 13 will be applied in national stage applications entered under 35 U.S.C. 371 because 35 U.S.C. 372(b)(2) provides that "The Commissioner may cause the question of unity of invention to be reexamined under section 121 of this title, within the scope of the requirements of the treaty and the Regulations". However, continuing applications filed under 35 U.S.C. 111 of international applications under the provisions of 35 U.S.C. 365(c) will be subject to the same restriction practice as other United States national applications filed under 35 U.S.C. 111. However, it is noted that where several inventions have been searched in the parent international application, the examination of such inventions in a continuing national application may not be burdensome and the examiner may consider all the inventions in such an application without making a restriction requirement.

Implementation of Unity of Invention Practice in International Applications and National Stage Applications Entered Under 35 U.S.C. 371

(1) The practice established by these rules for international and national stage applications will *not* be applied to national applications filed under 35 U.S.C. 111.

(2) The practice established by these rules will *not* affect the treatment of the claims of any applications (national or international) where the question of lack of unity of invention relates to other than different categories of invention issues.

Therefore, restriction and unity of invention practice involving, for example, Markush type claims, genus-species, intermediate-final product or combination-subcombination situations is *not* affected for any applications by this rule change.

(3) The criteria of § 1.141 would continue to be applicable to U.S. national applications filed under 35 U.S.C. 111 in a manner similar to that in effect prior to the Caterpillar decision and essentially the same as the practice which was in effect for many years prior to the PCT implementation. That is, national restriction practice will continue as set forth in MPEP Chapter 800, as modified in 1046 O.G. 2 for the

practice relating to product, process of making and process of using. The practice in this latter situation is that a three way requirement for restriction can only be made where the process of making is distinct from the product (i.e., the requirements of MPEP 806.05(f) are met). Otherwise, claims to the process of using must be joined with the claims directed to the product and the process of making the product even though a showing of distinctness between the product and process of using the product (MPEP 806.05(h)) could be made. This concept is included in paragraph 1.141(b).

(4) Under the rules, the criteria of PCT Rule 13.2 will be applied when considering unity of invention of claims drawn to different categories of invention in international applications as an International Searching Authority, International Preliminary Examining Authority, and as a Designated or Elected Office in international applications which enter the national stage under 35 U.S.C. 371.

(5) Under the rules, in applying PCT Rule 13.2 to international applications as an International Searching Authority, an International Preliminary Examining Authority and to national stage applications under 35 U.S.C. 371, examiners will consider for unity of invention all of the claims to different categories of invention in the application and will permit retention in the same application for searching and/or examination, claims to the categories which meet the requirements of any one of PCT Rule 13.2(i) to (iii).

Under the rules, the USPTO will also permit in the same international or national stage application the following two combinations:

(1) An independent claim for a given product and an independent claim for a process specially adapted for the manufacture of said product.

(2) An independent claim for a given product and an independent claim for a process of using the said product.

Under the rules, if an application contains a combination of categories of claims which do not fall within any *one* of the combinations of PCT Rule 13.2(i) to (iii) or additional combinations (1) or (2) above, i.e., they claim more or less categories of invention than permitted in any one of PCT Rule 13.2(i) to (iii) or combination (1) or (2) above, unity of invention may not be present.

Further, an independent claim for a use in PCT Rule 13.2(i) and combination (2) above will be construed as being limited to a claim directed to a process of using. In determining unity of invention under PCT Rule 13.2 (i) and (iii) and combination (1) above, under the rules, the examiner will consider the word "specially" which appears before "adapted" to be an emphasis word rather than a limitation. In determining unity of invention under PCT Rule 13.2(ii), the examiner will consider the word "specifically" which appears before "designed" to be an emphasis word rather than a limitation.

Under the rules, if an application includes claims to all the categories of invention set forth in any one of PCT Rule 13.2 (i), (ii), (iii), combinations (1) or (2) above, and no additional categories of invention are present, unity of invention will exist and no additional fees will be required or restriction requirement made.

For example, if an application contained claims to only a process for the manufacture of a product and claims to a use of a product and no product claim is present, there will be lack of unity of invention since the provisions of Rule 13.2(i) do not apply because claims to all categories of invention set forth in PCT Rule 13.2(i) are not included in the application and the process for manufacture of a product is independent of the use of the product since neither is dependent on the other. Also if claims to all three categories of PCT Rule 13.2(i) were present at the time of the first Office action in a national stage application and all the product claims are rejected in the first Office action, a requirement for restriction could also be made, if appropriate, in view of independent inventions being in the application without an allowable linking (product) claim.

Under the rules, where claims to a category of invention in addition to those listed in any one of PCT Rule 13.2 (i), (ii), (iii) or combinations (1) or (2) above are included in an application, unity of invention may be lacking between the claims drawn to the combination of the categories of invention set forth in any *one* of PCT Rule 13.2 (i), (ii) or (iii) or combinations (1) or (2) above, and the claims to the additional category of invention. For example, if an application contains claims to a process for manufacture, claims to an apparatus or means for carrying out the process and claims to a process of using the product manufactured, there could be lack of unity of invention. In such a situation the examiner should group the claims to the process for manufacture and the claims for an apparatus or means for carrying out the process because unity of these two categories exists under PCT Rule 13.2(ii). The claims to the use of the product can be separately grouped if the "use" is shown to be "independent and distinct" of both the "process for manufacture" and the "apparatus or means for carrying out the process" as provided in Chapter 800 of the Manual of Patent Examining Procedure (MPEP).

When the claims presented in an application are directed to several categories of invention under the rules so that more than one paragraph of PCT Rule 13.2 and combinations (1) or (2) above applies, the examiner would inspect the claims to see if the categories of invention set forth in PCT Rule 13.2, paragraphs (i), (ii) and (iii), and then combinations (1) or (2) above are present in the application in that order. For example, if the categories of PCT Rule 13.2(i) are found in the application, the claims to those categories stated in PCT Rule 13.2(i) will be considered as one invention and any claims to different categories of invention will be reviewed to determine if they are "independent and distinct" of *all* the claims covered in PCT Rule 13.2(i) in accordance with the provisions of Chapter 800 of the MPEP.

(6) Under PCT Rule 13.2 and combinations (1) and (2) above, unity will exist where the claims are limited to one invention in each category of invention recited. For example, under PCT Rule 13.2(i), claims are permitted to one product, one process of manufacturing the product and one use of the product. If multiple products, processes of manufacture or uses are claimed, the first invention in the category first mentioned in the claims would be considered as the elected invention under the rules. The first recited invention of each additional category which is related to the first invention as indicated in the previous sentence will be considered elected. Accordingly, for example, if multiple products are claimed, the first recited product will be considered to be constructively elected and if multiple processes adapted for making and/or using the product are claimed, the first recited process will also be constructively elected. Any additional inventions of the same category will be subject to payment of additional fees during the international stage. In a national stage application submitted under 35 U.S.C. 371 any such holding by the examiner will be made in the form of a restriction requirement. Such a restriction requirement will be made on the basis of criteria set forth in MPEP Chapter 800. Applicant will have the right to traverse such a restriction requirement in the response to the Office action.

(7) Inventions of different categories, to have unity of invention, must be related rather than independent

inventions. For example, the product as claimed in PCT Rule 13.2(i) and combinations (1) and (2) above must be capable of being made by the claimed process for manufacture or being used in the claimed process of use. Likewise in PCT Rule 13.2(ii), the apparatus as claimed must be capable of carrying out the claimed process. In PCT Rule 13.2(iii), the claimed process of manufacture must be capable of preparing the claimed product and the claimed apparatus or means must be able to perform the claimed process of manufacture.

(8) Under §§ 1.494 and 1.495, applicants must indicate on all application papers filed for entry under 35 U.S.C. 371 that the filing is being made under 35 U.S.C. 371. Otherwise, the application papers will be treated as having been filed under 35 U.S.C. 111.

Patent Cooperation Treaty, Chapter II

The Patent Cooperation Treaty became effective for the United States on January 24, 1978. The United States, however, was one of six countries (out of the 40 countries who have ratified or acceded to the Treaty) which had reservations not to be bound by Chapter II. The document removing the reservation as to Chapter II was deposited with the Director General of the World Intellectual Property Organization on April 1, 1987. Accordingly, Chapter II of the Treaty for the United States of America, Pub. L. 99-616 and these final regulations become effective 3 months later on July 1, 1987.

Chapter I of the Patent Cooperation Treaty provides a standardized application format and a centralized filing procedure for international patent applications. Pursuant to Chapter I, an applicant may submit an international application, designating those member countries in which the applicant desires patent protection. Filing an international application has the same effect as filing a separate application in all designated member states with respect to the filing date. In addition, by filing an international application, the applicant does not have to incur the expenses associated with national patent prosecution in the designated countries until 20 months from the priority date of the international application. During this period, the applicant obtains an international search report citing prior art deemed to be relevant to the claims of the invention contained in the international application. This helps the applicant decide whether to proceed with patent prosecution in the various countries originally designated.

Chapter II of the Patent Cooperation Treaty provides two further benefits for the applicant. First, an additional 10 months is allowed, for a total of 30 months from the priority date of the international application, before the applicant must decide whether to proceed with national patent prosecution in the elected countries. Second, the applicant is provided with an international preliminary examination report. In contrast to the international search report, which provides citations of prior art pertinent to the invention, the international preliminary examination report is a non-binding opinion from an International Preliminary Examining Authority as to whether the invention is novel, involves an inventive step (is non-obvious), and is industrially applicable. A preliminary examination report will be established within 28 months from the priority date. This preliminary examination report, together with the additional 10 months before the decision to proceed with national prosecution is required, places the applicant in a better position to consider commercial factors associated with the invention and to decide whether to pursue patent protection in the various elected countries.

To take advantage of these benefits provided by Chapter II, an applicant must file a "Demand" for a preliminary examination in an appropriate International Preliminary Examining Authority prior to the expiration of the 19th month from the priority date and pay certain fees. The final rules establish the amounts of some of the necessary fees and procedures under Chapter II and also group all the rules unique to international applications in a separate area of the regulations. The rules fall into three groups: (1) those directed to procedures under Chapter I, (2) those directed to procedures under Chapter II, and (3) those directed to entering the national stage under 35 U.S.C. 371.

Changes From the Proposed Rules

In § 1.475, a new paragraph (f) has been added which sets forth in the rules the exact wording of PCT Rule 13. PCT Rule 13 was included in the proposed rules as a footnote. The incorporation of the wording of PCT Rule 13 into § 1.475(f) will make it easier to refer to and easier to locate. Sections 1.475, 1.476, 1.487 and 1.490 are also changed to refer to § 1.475(f) rather than footnote 1.

In § 1.480(c), the wording has been clarified by adding a reference to the election of the United States.

Section 1.484(f) has been modified from the proposal to permit more than one interview in those situations where the examiner considers that an additional interview would be helpful.

In § 1.485, paragraph (b) has not been included since the substance thereof is set forth in § 1.484(d).

In § 1.492(a) (2) and (3), "i" has been deleted in order to refer to both § 1.445(a)(2) (i) and (ii).

An additional paragraph (a)(4) has been added to § 1.492 and an additional paragraph (b) has been added to § 1.496 which provide for a substantially reduced national fee and special procedure, respectively, where the application has satisfied the requirements of novelty, inventive step (non-obviousness) and industrial applicability before the United States International Preliminary Examining Authority as to the identical claims which are in the application at the national stage in the Patent and Trademark Office. Amendments during subsequent prosecution will only be permitted in response to an examiner's rejections or objections. Thus, no new claims are permitted. Therefore, most of such cases will require little or no prosecution to satisfy the requirements for patentability. The title of § 1.496 has been broadened in view of the new paragraph (b) and proposed § 1.496 has been redesignated as paragraph (a).

In §§ 1.494 and 1.495, an additional paragraph has been added to indicate the date of abandonment of an international application as to the United States if the requirements of 35 U.S.C. 371(c) are not timely fulfilled.

Response to Comments Received

Specific comments were received on several of the proposed rules, particularly those relating to unity of invention and fees. Sixteen letters submitting written comments were received. Oral testimony was presented by five persons at the public hearing conducted on April 6, 1987 resulting in 46 pages of testimony. All of the written and oral comments were considered in adopting the changes set forth herein. Comments suggesting modifications to the proposed rules or requesting clarification thereto appear below with responses thereto.

Comment. A question was raised as to whether the deadline for filing a continuing application under 35 U.S.C. 365(c) and 120 was 20 or 22 months under Chapter I and 30 or 32 months under Chapter II.

Reply. The Patent and Trademark Office considers the international application to be pending until the 22nd month from the priority date if the United States has been designated and no Demand for International Preliminary

Examination has been filed prior to the expiration of the 19th month from the priority date and until the 32nd month from the priority date if a Demand for International Preliminary Examination which elected the United States of America has been filed prior to the expiration of the 19th month from the priority date, provided that a copy of the international application has been communicated to the Patent and Trademark Office within the 20 or 30 month period, respectively. If a copy of the international application has not been communicated to the Patent and Trademark Office within the 20 or 30 month period respectively, the international application becomes abandoned as to the United States 20 or 30 months from the priority date respectively. These periods have been placed in the rules as paragraph (h) of § 1.494 and paragraph (i) of § 1.495. A continuing application under 35 U.S.C. 365(c) and 120 may be filed anytime during the pendency of the international application.

Comment. A comment was received concerning the situation where a continuing application is filed under 35 U.S.C. 365(c) of an international application which claims priority of an earlier filed foreign application as to (1) whether the applicant must specifically claim priority in the continuing application and (2) whether the certified copy of the priority application which may have been communicated to the Patent and Trademark Office by the International Bureau may be relied upon without any need to file a certified copy of the priority application in the continuing application.

Reply. As to item (1), it is necessary under the statute for the applicant to claim priority in the continuing application. Otherwise there is no indication that such benefit is desired in the continuation and the information may not be present for printing of any subsequent patent.

As to item (2), the certified copy of the priority application communicated by the International Bureau is placed in a folder and is not assigned a U.S. serial number unless the national stage is entered. Such folders are disposed of if the national stage is not entered. Therefore such certified copies may not be available if needed later in the prosecution of a continuing application. An alternative would be to physically remove the priority documents from the folders and transfer them to the continuing application. The resources required to request transfer, retrieve the folders, make suitable record notations, transfer the certified copies, enter and make of record such copies in the continuing applications is substantial. Accordingly, the priority documents in folders of international applications which have not entered the national stage may not be relied on.

Comment. One comment raised the question whether a continuing application filed under 35 U.S.C. 111 and entitled to the benefit of a prior international application designating the United States under 35 U.S.C. 365(c) and 120 would be subject to the PCT unity practice of § 1.499 or the national restriction practice under § 1.141.

Reply. A continuing application filed under 35 U.S.C. 111 would be subject to the national restriction practice as set forth in § 1.141 and Chapter 800 of the Manual of Patent Examining Procedure. Only those international applications entering the national stage under 35 U.S.C. 371 and § 1.494 or § 1.495 would be subject to the unity of invention practice set forth in § 1.499.

Comment. Five comments were made to the effect that the unity practice set forth in the rules was not consistent with the unity of invention criteria currently under discussion in the WIPO "harmonization" treaty meetings.

Response. At the present time there appears to be no agreed upon unity practice in the harmonization meetings. Only a discussion document has been prepared by WIPO. The Patent and Trademark Office is currently making a very intensive study of unity of invention in the United States, Japan and the European Patent Office. The practice which may result from this study and subsequent discussions is also not clear at this time. For these reasons as well as the fee implications of such a change, it is considered preferable to proceed with a clarification of the unity of invention practice which is to be used as part of the regulations for use by patent applicants and examiners at this time and, if modification of the practice is required in the future, appropriate changes in the law and the rules will be made at that time.

Comment. Two comments argued that the difference in treatment of unity of invention is contrary to 35 U.S.C. 372(a).

Reply. 35 U.S.C. 372(a) states:

> All questions of substance and, within the scope of the requirements of the treaty and Regulations, procedure in an international application designating the United States shall be determined as in the case of national applications regularly filed in the Patent and Trademark Office.

This section is interpreted as relating only to substantive questions of patentability which includes matters such as the definition of prior art. See PCT Article 27(5). If section 372(a) were interpreted to include items other than those relating to substantive questions of patentability, items such as requirements to obtain a filing date would be included. Clearly, an international application must only meet the filing date requirements of PCT Article 11(1) even though a U.S. national application must meet the requirements of 35 U.S.C. 111.

Comment. One comment was received stating that the U.S. rules should define prior art for PCT purposes and also the manner of issuing International Preliminary Examination Reports.

Reply. Prior art for PCT purposes is already defined in PCT Rule 64 and the procedures are set forth in PCT Rules 66 and 70. To repeat the substance of these PCT rules in the U.S. rules would be duplicative and possibly lead to different interpretations if different wording was used.

Comment. One comment inquired whether the International Preliminary Examining Report was binding on a USPTO examiner in the national stage.

Reply. An International Preliminary Examination Report is not binding on a USPTO examiner. PCT Article 33(1) clearly states that the "objective of the international preliminary examination is to formulate a preliminary and non-binding opinion." Since the USPTO has had no experience with International Preliminary Examination Reports prepared by foreign offices, as well as foreign offices having no experience with Reports prepared by the USPTO, the degree of reliance on such Reports in the national stage cannot be determined at the present time. Studies underway with the European Patent Office and the Japanese Patent Office regarding inventive step and other matters and experience with Reports from other International Preliminary Examining Authorities may be helpful in further addressing this question in the future.

Comment. Two comments were received asking why § 1.141(b) was being changed since there was no change in U.S. restriction practice.

Reply. No change is being made in U.S. restriction practice in applications filed under 35 U.S.C. 111. The amendments to § 1.141 basically delete expressions used in the Patent Cooperation Treaty which are not used in U.S. national practice. The criteria deleted from § 1.141(b) still remain in Chapter 800 of the Manual of Patent Examining Procedure.

Comment. One comment was made that any interpretation by the PTO of

the PCT Unity language will carry over to the Harmonization Treaty.

Reply. The U.S. delegation to the WIPO harmonization meetings has several times requested that guidelines be prepared for consideration with the Unity of Invention Article and Rules. Any interpretation of future treaty wording would be controlled by the guidelines.

Comment. Three comments were received that the PTO is attempting to promulgate a variation of PCT Rule 13 which is contrary to the Caterpillar decision because the U.S. rules are not identical in scope with PCT Rule 13.

Reply. The U.S. rules relating to Unity of Invention are considered to be in accordance with PCT Rule 13 and the Caterpillar decision. Rules 1.475, 1.487 and 1.499 are not identical with PCT Rule 13.2 because the U.S. rules are somewhat broader because additional combinations are included. The U.S. rules are also consistent with the Caterpillar decision because this decision related only to the interpretation of the expressions in PCT Rule 13.2.

Comment. One comment inquired as to the amount of the handling fee.

Reply. The amount of the handling fee is set forth in the SCHEDULE OF FEES appearing at the end of the PCT Rules. These fees are stated in Swiss Francs. The current amount for the Handling Fee is 200 Swiss Francs. The amount in U.S. dollars will be established by the Director General based on the current exchange rates as provided in PCT Rule 57.2(c).

Comment. One comment proposed that a rule be implemented under which an examiner must complete the first written opinion within two months of the filing of the Demand.

Reply. Although the Office will expect an examiner to begin the International Preliminary Examination as early as possible after receipt, delays in issuing the written opinion may occur because the International Preliminary Examination fee was paid later than the filing of the Demand under PCT Rule 58.2, the application contains defects in form or contents or the application lacks unity of invention. Thus, such a rule would not be appropriate.

Comment. One comment questioned the need to re-impose restriction (holding of lack of unity of invention) if a linking claim is not allowable.

Reply. There is no mandatory requirement that the examiner impose a holding of lack of unity if the linking claim is shown to lack novelty and inventive step. However, if such a possibility did not exist, applicants could present broad generic claims to entire classes of inventions and thereby prevent any subsequent holding of lack of unity by the examiner.

Comment. One comment suggested that applicants in national patent applications be allowed to take advantage of the PCT unity criteria by paying a surcharge.

Reply. Such a fee is not provided for under 35 U.S.C. 41 and would appear to require legislative action.

Comment. Three comments suggested that the increases in the search fees were either unlawful or inconsistent with the spirit of the Patent and Trademark Office Authorization Act passed by Congress in 1986 in view of the freeze imposed thereby.

Reply. The Patent and Trademark Office Appropriations Act (Public Law 99-607) at Sec. 3(b) states.

> (b) PATENT FEES.—The Commissioner of Patents and Trademarks may not, during fiscal years 1986, 1987, and 1988, increase fees established under section 41(d) of title 35, United States Code, except for purposes of making adjustments which in the aggregate do not exceed fluctuations during the previous 3 years in the Consumer Price Index, as determined by the Secretary of Labor. The Commissioner also may not establish additional fees under such section during such fiscal years.

The legislative history also makes clear that the prohibition against fee increases relates only to those fees established under section 41(d) and indicates that fees for new types of processing, services, or materials are not prohibited. The prohibition in the appropriation authorization is strictly limited to fees established under 35 U.S.C. 41(d) and does not affect the authority of the Commissioner to set fees under the Patent Cooperation Treaty. Note 35 U.S.C. 376 which authorizes the Commissioner to set fees for both the international and national stages. The new services relating to unity of invention are clearly not within the scope of the appropriation authorization restriction.

Comment. Three comments stated that the $100 fee increase for an international search is clearly excessive.

Reply. The increase in the search fee is to recover the average estimated additional cost of processing international applications with claims to more inventions than were permitted when the current search fees were established. The increase is established also to provide for an expected higher percentage of international applications containing claims to more than one category of invention. If experience shows these expectations were in error, fees will be adjusted in the future.

Comment. One comment stated that the increase in the international search fee was not justified by *Caterpillar Tractor Co. v. Commissioner of Patents and Trademarks*, 231 USPQ 590 (E. D. Va. 1986) which merely clarified an aspect of existing law and did not change it.

Reply. The decision in the Caterpillar case indicated that the Office's criteria for unity of invention on which the amount of the search fee was determined were too strict in construing the language of the Treaty and that broader criteria were permitted under the terms of the Treaty. Fees under the Patent Cooperation Treaty were set based on pre-Caterpillar interpretations of PCT Rule 13.2 by the Patent and Trademark Office. Since such broader criteria require a more extensive search than that on which the search fee was previously calculated, an increase in the search fee is necessary to cover the cost of the additional search required under the broader criteria in accordance with the Caterpillar decision.

Comment. One comment stated that the increase in the international search fee penalizes an applicant presenting clearly a single invention.

Reply. A broadening of the interpretation of unity of invention and the increase in the average amount of work required in searching an international application results in a higher fee being required. A more narrow interpretation of unity of invention permits a lower average fee and would tend to benefit applicants with a clearly single invention. The Caterpillar decision and majority of comments received supported a more liberal interpretation of unity of invention. Testimony at the hearing indicated a preference for spreading any additional costs among all applicants.

Comment. One comment was received which suggested that § 1.484(d) be amended by adding a further sentence.

> If, after receipt of any response to the written opinion, the Examiner is of the opinion that some or all of the claims are not patentable, the Examiner shall issue a second written opinion which identifies any patentable subject matter, including any suggestions for claim modification to properly define the invention.

Reply. The wording of the proposed sentence is clearly inappropriate since the International Preliminary Examination Report does not make any determination of "patentability." Note PCT Article 35(2). Furthermore, the time limits for issuing an International Preliminary Examination Report are such that there may not be sufficient time in most cases to issue a second

opinion and receive a response thereto. Modifications in the interview practice are a more practical way of assuring a more complete and thorough international preliminary examination.

Comment. One comment suggested that § 1.484(f) be amended to read:

An applicant will be permitted *at least* [no more than] one personal [or telephone] interview, which must be conducted *prior to 27 months from the priority date* [during the non-extendable time limit for response by the applicant to the written opinion].

Reply. A less restrictive interview policy has been incorporated into § 1.484(f). The period for an interview cannot be delayed until the 27th month from the priority date since this is the time at which the examiners will be required to complete their Reports in order to allow time for review and mailing.

Comment. One comment proposed that § 1.485 be amended as follows:

The time limit for response in a written opinion of the International Preliminary Examining Authority may not be extended *to expire beyond 27 months from the priority date, without the permission of the Group Director.*

Reply. No need is seen to limit the end of the response period to the end of the 27th month since the period will be set by the examiner when a written opinion is mailed. The time limit cannot be extended (§ 1.484(d)) due to tight time frames for establishing the International Preliminary Examination Report within 28 months from the priority date. The time limits for response to a written opinion are set forth in PCT Rule 66.2(d).

Comment. Two written comments and the oral testimony indicated that the fees for entering the national stage should be considerably less after an international search and preliminary examination. The small $40.00 reduction in national stage fees is criticized as too small and a token fee of $40–$50 is stated as being more reasonable.

Reply. The fees are based on an adjustment of the U.S. filing fee based on estimated additional work or savings. However, in view of the comments, an additional basic national fee level has been added as § 1.492(a)(4) for those situations where the Patent and Trademark Office has established an International Preliminary Examination Report which indicates that all the claims entering the national stage have satisfied the criteria of PCT Articles 31(1) to (4). Current studies of the benefit of having PCT search reports from the searching authorities indicate an improvement in quality but no overall reduction in search or examining time. The search report from other than international searching authorities, with rare exceptions, does not allow the USPTO examiner to eliminate any part of the national search.

Comment. One comment argued that reciprocal treatment should be given to foreign applicants for benefits given U.S. applicants.

Reply. Although the European Patent Office offers a 20% reduction of only the search fee portion of its national stage entry fees, the resulting fee of a little under $1000 at current exchange rates is still more than twice the amount of the highest U.S. national fee. In Japan the national fee for requesting examination is currently 26,000 yen (a little under $200 at current exchange rates) where the search report was not prepared by the Japanese Patent Office and 6,000 yen if the search report was prepared by the Japanese Patent Office.

Comment. One comment urged that the U.S. rules match the less restrictive EPO rules with regard to the issuance of more than one written opinion and providing additional opportunity for the applicant to communicate with the examiner.

Reply. The proposed rules (§ 1.484) have been modified to provide for a less restrictive interview practice. The examiner should permit interview(s) during the time limit for response to the written opinion where such interviews would be useful and time is available to permit issuance of the International Preliminary Examination Report prior to the deadline of 28 months after the priority date.

Although nothing in the rules limit the proceedings to one written opinion, most demands are expected to be filed near the end of the 19th month deadline. Preparation of the first written opinion may be delayed because the fees were not paid at the time of filing the Demand, formal errors are found in the documents or unity of invention is lacking. The time limits for a reply to the first written opinion will normally be set at 2 months, although 3 months may be given where the time limit for reply ends prior to 25 months from the priority date. Response by the 25th month will allow the examiner 2 months to prepare the International Preliminary Examination Report.

However, a Demand may be filed much earlier than 19 months from the priority date and International Preliminary Examination may begin early as provided for in PCT Rule 69.1(b). Where time and other circumstances permit, a second written opinion may be provided, possibly with a one month time limit for reply.

Comment. One comment stated that proposed § 1.485(b) is a duplication of § 1.484(d).

Reply. Proposed paragraph (b) has been deleted in final rule 1.485.

Comment. One comment stated that procedures for the manner of issuing International Preliminary Examination Reports should be set forth in the U.S. rules.

Reply. Items already specifically covered in the PCT articles and rules are not needed in U.S. rules. The agreement with WIPO also regulates these matters as do the PCT search and preliminary examination guidelines.

Comment. One comment stated that the treatment of the International Preliminary Examination Report (IPER) by the USPTO at the national stage is not clear.

Reply. The IPER will be considered along with other relevant information when conducting a national examination for patentability. PCT Article 33(1) indicates that the objective of the International Preliminary Examination Report is to formulate a preliminary and non-binding opinion; it is not binding on any office. Any new questions relating to patentability may be raised.

Comment. One comment stated that a dual standard of unity defies logic.

Reply. The dual standard is necessary since the fees for patent applications filed under 35 U.S.C. 111 were set based upon an application being limited to one invention as defined at the time the fees were set which differs from the interpretation of unity under PCT required in view of the Caterpillar decision.

Comment. One comment stated that if additional PCT international search fees are required they should be made by statutory change.

Reply. The Commissioner is authorized by statute (35 U.S.C. 376) to set the national fee for PCT origin applications. Any change in national restriction practice for applications filed under 35 U.S.C. 111 would be made only after statutory change.

Comment. One comment indicated that in view of the Caterpillar decision holding the Office interpretation of "specifically designed" to be an unreasonable interpretation, the Office is proposing a double standard.

Reply. U.S. national law under 35 U.S.C. 121 does not require a consideration or interpretation of "specifically designed" to be made. This must only be made in PCT cases and those entering the national stage under 35 U.S.C. 371.

Discussion of Specific Rules

Section 1.8 is amended to indicate clearly that the certificate of mailing procedures thereunder may not be used for the filing of papers and fees relating to international applications. It should be noted that the provisions of § 1.10 regarding the filing of papers or fees by "Express Mail" apply to all papers and fees to be filed in the Patent and Trademark Office, including those relating to international applications.

Section 1.61 "Filing of applications in the United States of America as a Designated Office" is removed and the substance thereof moved to new § 1.494. Section 1.70 "Oath or declaration under 35 U.S.C. 371(c)(4)" is removed and the substance thereof moved to new § 1.497. These moves result in the rules relating to the international applications entering the national stage being located in a single area of the rules.

Section 1.101 is amended to remove the discussion of the order of examination for international applications entering the national stage, which is covered by new § 1.496.

Section 1.141 is amended to basically return the rule to its wording prior to the 1978 rule change implementing the Patent Cooperation Treaty and will be directed solely to national applications. This will avoid confusion with PCT Rule 13.2 which was interpreted by the court in *Caterpillar Tractor Company* v. *Commissioner of Patents and Trademarks*, supra, to have a different meaning than intended in present § 1.141. It does, however, retain for applicants the ability to claim a "reasonable number" of species rather than only 5, which limit existed prior to the 1978 rule change. Paragraph (b) continues the practice stated in the *Official Gazette* notice of August 1, 1984 published at 1046 O.G. 2. Unity of invention in international applications before the USPTO as an International Searching Authority under Chapter I of the Patent Cooperation Treaty is covered by § 1.475. Unity of invention before the USPTO as an International Preliminary Examining Authority under Chapter II of the Patent Cooperation Treaty is covered by § 1.487. Unity of invention in international applications entering the national stage under 35 U.S.C. 371 is covered by § 1.499.

Section 1.401 is amended to include the definition of some terms used for Chapter II of the Patent Cooperation Treaty.

Section 1.414 is amended to include reference to the United States Patent and Trademark Office functioning as an Elected Office under Chapter II of the Patent Cooperation Treaty as well as a Designated Office under Chapter I.

Section 1.416 is added to indicate and describe the functioning of the United States Patent and Trademark Office as an International Preliminary Examining Authority under Chapter II of the Patent Cooperation Treaty.

Sections 1.431 and 1.432 are amended, in accordance with PCT Rule 15.4(b)(ii) and amended 35 U.S.C. 361, to indicate that the time limit for payment of the designation fee is one year from the priority date or one month from the date of receipt of the international application if that one month time limit expires after the expiration of one year from the priority date.

Section 1.445 is amended to increase the amount of the international search fees to provide for recovery of the average additional cost of processing applications with claims to more inventions than were permitted under the unity of invention criteria used when the previous international search fee amounts were established. The amounts for national stage fees are removed from § 1.445 and are now set forth in § 1.492.

The international search fee and national fees were previously established based on the effort and cost to the Office of searching and examining a single invention as defined by the United States Patent and Trademark Office prior to the decision in the Caterpillar case. Since additional effort will be required to search and examine an average application under the new rules defining unity of invention, the average international search and national fee must also be increased to cover the additional cost to the Office.

Section 1.475 "Changes in person, name, or address of applicants," is redesignated as § 1.472 to allow the grouping of rules into PCT Chapter I, PCT Chapter II and national stage related rules. No change other than redesignation is made.

A new § 1.475 is added to relate to unity of invention before the International Searching Authority. Paragraph (a) clearly indicates that PCT Rule 13 is to be followed in all such cases and paragraph (b) adds combinations acceptable under unity of invention in addition to those set forth in PCT Rule 13.2. Paragraph (c) relates to the handling of claims to categories in addition to the combinations specified in paragraph (b). Paragraph (d) relates to situations in which more than one invention of the same category of invention is recited in an international application. Paragraph (e) makes clear that inventions of different categories must be related, rather than independent, for unity of invention to exist. Paragraph (f) sets forth PCT Rule 13 for the convenience of patent applicants.

Section 1.481, regarding determination of unity of invention before the International Searching Authority, is redesignated as § 1.476 and amended to delete reference to § 1.141 from paragraph (a).

Section 1.482 is redesignated as § 1.477 and amended to make clear in the title that it deals with protests to findings of lack of unity of invention before the International Searching Authority. The amendment to paragraph (b) corrects an error in referring to another paragraph of the section.

A new § 1.480 is added to deal with the Demand for an international preliminary examination. Paragraph (a) indicates that a Demand is required to be filed to obtain an international preliminary examination and that the preliminary examination fee of § 1.482(a)(1) and the handling fee of § 1.482(b) are due at the time of filing of the Demand. If the fees are not paid at the time of filing of the Demand, the United States Patent and Trademark Office acting as an International Preliminary Examining Authority will provide an opportunity to pay the fees in accordance with PCT Rules 57.4 and 58.2.

Paragraph (b) of § 1.480 specifies that the Demand must be made on a standardized form as required by PCT Rule 53.1 and that such forms are available from the United States Patent and Trademark Office.

Paragraph (c) of § 1.480 specifies that, if the Demand is made prior to the expiration of the 19th month from the priority date, the provisions of PCT Article 39 and § 1.495 shall apply to allow entry into the national stage prior to the expiration of 30 months after the priority date. The final rule has been changed to add reference to the election of the United States. If the Demand is not filed prior to the expiration of the 19th month from the priority date, the provisions of PCT Article 22 and § 1.494 shall apply to allow entry into the national stage prior to the expiration of 20 months after the priority date.

Paragraph (d) of § 1.480 indicates that withdrawal of a proper Demand will not entitle applicant to a refund of the preliminary examination fee even if no claims are found that can or will be searched (PCT Article 34(4)(a)). A Demand that is so informal that it would be considered under the PCT Rules as if it had not been submitted will not be considered a proper Demand under the rule. A change in purpose after the filing of a Demand will not entitle an

applicant to a refund of the preliminary examination fee. PCT Rule 57.6 states that in no case shall the handling fee, or any supplement to the handling fee, be refunded.

A new § 1.482 is added to specify the international preliminary examination fees. Paragraph (a) sets a lower fee for the international preliminary examination where an international search fee has been paid on the international application to the United States Patent and Trademark Office as an International Searching Authority. Paragraph (a) also sets a lower additional preliminary examination fee for the preliminary examination of additional inventions found in the international application where a supplemental search fee has been paid on the international application to the United States Patent and Trademark Office as an International Searching Authority. Paragraph (b) indicates that the handling fee is prescribed in PCT Rule 57 and any necessary supplement to the handling fee shall be paid directly to the International Bureau in accordance with PCT Rule 57.1(b).

A new § 1.484 is added to describe the conduct of international preliminary examination. The rule describes that, if necessary, a written opinion will be established after consideration of any defects in accordance with PCT Rule 66.2 and after an examination to determine if the claimed invention has novelty, involves an inventive step (is non-obvious) and is industrially applicable. A written opinion prior to the international preliminary examination report would not be necessary if the international application does not contain any defects as mentioned in PCT Rule 66.2 and if all claims are found to be novel, involve an inventive step (non-obvious) and are industrially applicable. The written opinion will set a time limit for applicant to respond in accordance with PCT Rule 66.2(d). The time limit for reply will normally be two months but will be three months where the time limit will expire prior to 25 months from the priority date. The time limit may not be extended due to the tight time constraints under Chapter II of the Patent Cooperation Treaty. An international preliminary examination report will be established and one copy will be submitted to the International Bureau and one copy to applicant. The rule specifies that no international preliminary examination report will be established prior to issuance of an international search report and that no international preliminary examination will be conducted on inventions not previously searched by an International Searching Authority. Paragraph (f) specifies that at least one personal or telephone interview with the examiner will be permitted during the international preliminary examination. Additional interviews are permissible if the examiner determines that it would be helpful. Additional interviews will be governed, in part, by the time remaining before the time for issuance of the international preliminary examination report. The period during which the interview(s) can be held is limited by the non-extendable time limit for response by the applicant to a written opinion. Although nothing in this or any other rule limits the number of written opinions which may be established prior to the International Preliminary Examination Report, in most cases time will limit the number of written opinions to one.

A new § 1.485 is added to deal with amendments by applicant during international preliminary examination. An applicant is permitted by the rule to make amendments at the time of filing of the Demand and within the period set in any written opinion on the application as defined in § 1.484. Amendments under the rule would be required to be made by submitting replacement sheets and a description of how the replacement sheet differs from the replaced sheet. If an amendment cancels an entire sheet, that amendment should be communicated by letter without a replacement sheet. Proposed paragraph (b) is not promulgated because the substance thereof is set forth in § 1.484(d).

New § 1.487 defines what constitutes unity of invention before the International Preliminary Examining Authority. The standards for unity of invention generally parallel those set in § 1.475 regarding proceedings before the International Searching Authority.

New § 1.488 is added to set forth how the International Preliminary Examining Authority will proceed in handling determinations regarding the unity of invention criteria of § 1.487.

New § 1.489 sets forth the procedures to be followed by an applicant who wishes to protest a holding of lack of unity of invention by the International Preliminary Examining Authority. The additional fees would be required to be paid if more than one invention is to be examined, but could be accompanied by a request for refund and a statement setting forth reasons for disagreement with the holding of lack of unity of invention or why the required additional fees are excessive. This rule is in accordance with PCT Rule 68.3(c).

New § 1.491 is added to define the start of the national stage. Section 1.491 is the first rule in a new group of rules relating to applications entering the national stage pursuant to 35 U.S.C. 371.

New § 1.492 is added to set forth the fees and charges for international applications entering the national stage under 35 U.S.C. 371. The basic national fee is set forth in paragraph (a) at four levels to reflect the benefit that the United States Patent and Trademark Office will derive from having previously conducted an international preliminary examination or an international search. In § 1.492(a) (2) and (3), "(i)" has been deleted in order to refer to both § 1.445(a)(2) (i) and (ii). Paragraph (a)(4) which makes reference to § 1.496(b) has been added in view of comments received that indicated that in some instances substantial reliance may be placed upon the International Preliminary Examination Reports by the Patent and Trademark Office. The rule also sets the fee for an independent claim in excess of 3 (paragraph (b)), for presentation of each claim in excess of 20 (paragraph (c)) and for an application containing a multiple dependent claim (paragraph (d)). Paragraphs (e) and (f) include the fees previously contained in § 1.445 and include the alternative times for entering the national stage pursuant to § 1.494 or § 1.495.

New § 1.494 is added to contain substantially the provisions of former § 1.61 in amended form. This section relating to filing application documents in the United States Patent and Trademark Office to enter the national stage has been grouped with other sections relating to the national stage for the convenience of applicants and examiners involved in the prosecution of international applications entering the national stage. The rule applies where no Demand for international preliminary examination has been filed prior to the expiration of the 19th month from the priority date. If such a Demand were filed, § 1.495 would apply.

Section 1.494(f) requires that a specific indication be given by the applicant when entering the national stage that the documents being submitted are being submitted under 35 U.S.C. 371. If no clear indication is found, the documents will be considered to be for a regular national application under 35 U.S.C. 111. Paragraph (g) makes clear that the various time limits set out in the rule, some of which are set by the PCT, may not be extended pursuant to § 1.136 or otherwise. The extension of time provisions, including petition and payment of a fee, set out in § 1.136(a) do not apply to the time limits of the rule or

time limits set by the International Searching Authority or the International Preliminary Examining Authority. New paragraph (h) clarifies when an international application designating the United States becomes abandoned as to the United States.

New § 1.495 is added to deal with filing application documents in the United States Patent and Trademark Office to enter the national stage where a Demand for international preliminary examination has been filed with an International Preliminary Examining Authority prior to the expiration of the 19th month from the priority date. In such a case, an applicant will have 30 months from the priority date to enter the national stage. The rule parallels in many respects § 1.494. New paragraph (i) clarifies when an international application electing the United States becomes abandoned as to the United States.

New § 1.496 is added to specify in paragraph (a) that international applications in the national stage will be taken up for action based on the date when the requirements of 35 U.S.C. 371(c) are met. Paragraph (b) indicates that applications entering the U.S. national stage only with claims which have been found in an International Preliminary Examination Report to have satisfied the criteria for novelty, inventive step (non-obviousness) and industrial applicability as defined in PCT Article 33 (1) to (4) will be taken up for action before other applications. Preliminary amendments may accompany the filing of the national stage application to cancel claims which do not satisfy the criteria. These applications will have paid the lower filing fee set in § 1.492(a)(4) and most will not require extensive prosecution, i.e., objection or rejection before resolving the issue of patentability. Amendments will not be permitted to be made in such applications other than in response to objections as to form or to cancel claims in response to a rejection made by the examiner in the national stage application. Such a rejection could be necessary, for example, where applicant submits information in accordance with the duty of disclosure under 37 CFR 1.56(a).

New § 1.497 is added to contain substantially the wording of removed §1.70. This rule relates to the oath or declaration required to enter the national stage and is grouped with other national stage entry requirements.

New § 1.499 is added to cover unity of invention during the national stage. The provisions of the section are basically parallel to those of §§ 1.475 and 1.487. Paragraph (f) indicates the manner of handling a finding of lack of unity of invention on grounds other than those involving different categories of invention.

Environmental, Energy, and Other Considerations

The rule change does not have a significant impact on the quality of the human environment or conservation of energy resources.

The rule change is in conformity with the requirements of the Regulatory Flexibility Act (Pub. L. 96–354), Executive Order 12291, and the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 et seq.

The General Counsel of the Department of Commerce has certified to the Small Business Administration that the rule change will not have a significant adverse economic impact on a substantial number of small entities (Regulatory Flexibility Act, Pub. L. 96–354) because considerable savings can potentially be achieved under Chapter II of the Patent Cooperation Treaty because additional time is provided for applicants to decide whether to proceed with the cost of foreign prosecution and savings will in fact be achieved under the unity of invention practice and the provision for reduced fees for small entities entering the national stage in making an application for a United States patent.

The Patent and Trademark Office has determined that this rule change is not a major rule under Executive Order 12291. The annual effect on the economy will be less than $100 million. There will be no major increase in costs or prices for consumers, individual industries, federal, state or local government agencies, or geographic regions. There will be no significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

The information collection requirement contained in these rules was submitted to the Office of Management and Budget (OMB) at the time of the proposed rulemaking for review under Section 3504(h) of the Paperwork Reduction Act. OMB has approved the information collection requirement and has assigned OMB control number 0651–0021 thereto.

List of Subjects in 37 CFR Part 1

Administrative practice and procedure, Authority delegations (government agencies), Courts, Inventions and patents, Lawyers.

Notice is hereby given that pursuant to the authority granted to the Commissioner of Patents and Trademarks by 35 U.S.C. 6 and 376(b) and Pub. L. 99–616, the Patent and Trademark Office is amending Title 37 of the Code of Federal Regulations as set forth below.

PART 1—RULES OF PRACTICE IN PATENT CASES

1. The authority citation for 37 CFR Part 1 would continue to read as follows:

Authority: 35 U.S.C. 6 unless otherwise noted.

2. Section 1.8 is amended by revising paragraph (a)(2)(xi) to read as follows:

§ 1.8 Certificate of mailing.

(a) * * *

(2) * * *

(xi) The filing of international applications for patent and all papers and fees relating thereto.

* * * * *

§ 1.61 [Removed]

3. Section 1.61 is removed.

§ 1.70 [Removed]

4. Section 1.70 is removed.

5. Section 1.101 is amended by revising paragraph (a) to read as follows:

§ 1.101 Order of examination.

(a) Applications filed in the Patent and Trademark Office and accepted as complete applications are assigned for examination to the respective examining groups having the classes of inventions to which the applications relate. Applications shall be taken up for examination by the examiner to whom they have been assigned in the order in which they have been filed except for those applications in which examination has been advanced pursuant to § 1.102. See § 1.496 for order of examination of international applications in the national stage.

* * * * *

6. Section 1.141 is revised to read as follows:

§ 1.141 Different inventions in one national application.

(a) Two or more independent and distinct inventions may not be claimed in one national application, except that more than one species of an invention, not to exceed a reasonable number, may be specifically claimed in different claims in one national application, provided the application also includes an allowable claim generic to all the

claimed species and all the claims to species in excess of one are written in dependent form (§ 1.75) or otherwise include all the limitations of the generic claim.

(b) Where claims to all three categories, product, process of making, and process of use, are included in a national application, a three way requirement for restriction can only be made where the process of making is distinct from the product. If the process of making and the product are not distinct, the process of using may be joined with the claims directed to the product and the process of making the product even though a showing of distinctness between the product and process of using the product can be made.

Subpart C—International Processing Provisions

7. The authority for Subpart C is revised to read as follows:

Authority: Pub. L. 94–131, 89 Stat. 685 ; Pub. L. 99–616, 35 U.S.C. 351 through 376.

8. Section 1.401 is amended to redesignate paragraph (g) as paragraph (i) and add new paragraphs (g) and (h) as follows:

§ 1.401 Definitions of terms under the Patent Cooperation Treaty.

* * * * *

(g) "Demand," when capitalized, means that document filed with the International Preliminary Examining Authority which requests an international preliminary examination.

(h) "Annexes" means amendments made to the claims, description or the drawings before the International Preliminary Examining Authority.

* * * * *

9. Section 1.414 is revised to read as follows:

§ 1.414 The United States Patent and Trademark Office as a Designated Office or Elected Office.

(a) The United States Patent and Trademark Office will act as a Designated Office or Elected Office for international applications in which the United States of America has been designated or elected as a State in which patent protection is desired.

(b) The United States Patent and Trademark Office, when acting as a Designated Office or Elected Office during international processing will be identified by the full title "United States Designated Office" or by the abbreviation "DO/US" or by the full title "United States Elected Office" or by the abbreviation "EO/US".

(c) The major functions of the United States Designated Office or Elected Office in respect to international applications in which the United States of America has been designated or elected, include:

(1) Receiving various notifications throughout the international stage and

(2) Accepting for national stage examination international applications which satisfy the requirements of 35 U.S.C. 371.

10. Under "General Information," a new § 1.416 is added to read as follows:

§ 1.416 The United States International Preliminary Examining Authority.

(a) Pursuant to appointment by the Assembly, the United States Patent and Trademark Office will act as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office and in other Receiving Offices as may be agreed upon by the Commissioner, in accordance with agreement between the Patent and Trademark Office and the International Bureau.

(b) The United States Patent and Trademark Office, when acting as an International Preliminary Examining Authority, will be identified by the full title "United States International Preliminary Examining Authority" or by the abbreviation "IPEA/US."

(c) The major functions of the International Preliminary Examining Authority include:

(1) Receiving and checking for defects in the Demand;

(2) Collecting the handling fee for the International Bureau and the preliminary examination fee for the United States International Preliminary Examining Authority;

(3) Informing applicant of receipt of the Demand;

(4) Considering the matter of unity of invention;

(5) Providing an international preliminary examination report which is a non-binding opinion on the questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), and to be industrially applicable; and

(6) Transmitting the international preliminary examination report to applicant and the International Bureau.

11. Section 1.431 is amended by revising paragraph (d)(2) to read as follows:

§ 1.431 International application requirements.

* * * * *

(d) * * *

(2) The designation fee, or the amount necessary to cover all the designations made in the request if not paid by the applicant within one year from the priority date or within one month from the date of receipt of the international application if that month expires after the expiration of one year from the priority date.

* * * * *

12. Section 1.432 is amended by revising paragraph (b) to read as follows:

§ 1.432 Designation of States and payment of designation fees.

* * * * *

(b) The designation fees may be paid upon filing of the international application, but must be paid before the expiration of one year from the priority date or within one month from the date of receipt of the international application if that month expires after the expiration of one year from the priority date. Failure to timely pay the designation fee for a particular Designated State will result in the withdrawal of that designation. Failure to timely pay at least one designation fee will result in the withdrawal of the international application.

13. Section 1.445 is amended by revising the title and paragraph (a) to read as follows:

§ 1.445 International application filing, processing and search fees.

(a) The following fees and charges for international applications are established by the Commissioner under the authority of 35 U.S.C. 376:

(1) A transmittal fee (see 35 U.S.C. 361(d) and PCT Rule 14). $170.00.

(2) A search fee (see 35 U.S.C. 361(d) and PCT Rule 16) where:

(i) No corresponding prior United States national application with basic filing fee has been filed, $520.00.

(ii) A corresponding prior United States national application with basic filing fee has been filed, $350.00.

(3) A supplemental search fee when required, per additional invention, $140.00.

§ 1.475 [Redesignated as § 1.472]

14. Section 1.475 is redesignated as § 1.472.

15. A new § 1.475 is added following the heading, "Unity of Invention," to read as follows:

§ 1.475 Unity of invention before the International Searching Authority.

(a) An international application, before the International Searching Authority will be considered to have unity of invention if the claims are in

accordance with PCT Rule 13 (see paragraph (f) of this section).

(b) An international application containing claims to different categories of invention will be considered to have unity of invention if the claims are drawn only to one of the combinations of categories as set forth in PCT Rule 13.2 (see paragraph (f) of this section) or to the combination of—

(1) A product and a process for the manufacture of said product, or

(2) A product and a process of use of said product.

If an application contains claims to more or less than one of the combinations of categories set forth in PCT Rule 13.2 (see paragraph (f) of this section) or a combination set forth in paragraphs (b) (1) or (2) of this section, unity of invention may not be present.

(c) If an international application contains claims to a category of invention in addition to those categories included in any one of the combinations specified in paragraph (b) of this section, lack of unity of invention may be held between the categories included in the combination and the claims to the additional category of invention.

(d) Unity of invention will exist where the claims are limited to one of the combinations of categories set forth in PCT Rule 13.2 (see paragraph (f) of this section) or in a combination set forth in paragraphs (b) (1) or (2) of this section. If multiple products, processes of manufacture or uses are claimed, the first invention of the category first mentioned in the claims of the application and the first recited invention of each of the other categories related thereto will be considered as the inventions to be searched. Any such holding by the examiner will be made of record as a holding of lack of unity of invention.

(e) The inventions recited by the claims of different categories must be related rather than independent inventions.

(f) The wording of PCT Rule 13 is as follows:

PCT Rule 13—Unity of Invention

13.1 Requirement

The international application shall relate to one invention only or to a group of inventions so linked as to form a single general inventive concept ("requirement of unity of invention").

13.2 Claims of Different Categories

Rule 13.1 shall be construed as permitting, in particular, one of the following three possibilities:

(i) in addition to an independent claim for a given product, the inclusion in the same international application of an independent claim for a process specially adapted for the manufacture of the said product, and the inclusion in the same international application of an independent claim for a use of the said product, or

(ii) in addition to an independent claim for a given process, the inclusion in the same international application of an independent claim for an apparatus or means specifically designed for carrying out the said process, or

(iii) in addition to an independent claim for a given product, the inclusion in the same international application of an independent claim for a process specially adapted for the manufacture of the product, and the inclusion in the same international application of an independent claim for an apparatus or means specifically designed for carrying out the process.

13.3 Claims of One and the Same Category

Subject to Rule 13.1, it shall be permitted to include in the same international application two or more independent claims of the same category (i.e., product, process, apparatus, or use) which cannot readily be covered by a single generic claim.

13.4 Dependent Claims

Subject to Rule 13.1, it shall be permitted to include in the same international application a reasonable number of dependent claims, claiming specific forms of the invention claimed in an independent claim, even where the features of any dependent claim could be considered as constituting in themselves an invention.

13.5 Utility Models

Any designated State in which the grant of a utility model is sought on the basis of an international application may, instead of Rules 13.1 to 13.4, apply in respect of the matters regulated in those Rules the provisions of its national law concerning utility models once the processing of the international application has started in that State, provided that the applicant shall be allowed at least two months from the expiration of the time limit applicable under Article 22 to adapt his application to the requirements of the said provisions of the national law.

16. Section 1.481 is redesignated as § 1.476 and is amended by revising paragraph (a) to read as follows:

§ 1.476 Determination of unity of invention before the International Searching Authority.

(a) Before establishing the international search report, the International Searching Authority will determine whether the international application complies with the requirement of unity of invention as set forth in PCT Rule 13 (see § 1.475(f)) and § 1.475.

* * * * *

17. Section 1.482 is redesignated as § 1.477 and is amended by revising the title and paragraph (b) to read as follows:

§ 1.477 Protest to lack of unity of invention before the International Searching Authority.

* * * * *

(b) Protest under paragraph (a) of this section will be examined by the Commissioner or the Commissioner's designee. In the event that the applicant's protest is determined to be justified, the additional fees or a portion thereof will be refunded.

* * * * *

18. A new Section 1.480 is added preceded by a heading to read as follows:

International Preliminary Examination

§ 1.480 Demand for international preliminary examination.

(a) On the filing of a Demand and payment of the fees for international preliminary examination (§ 1.482), the international application shall be the subject of an international preliminary examination. The preliminary examination fee (§ 1.482(a)(1)) and the handling fee (§ 1.482(b)) shall be due at the time of filing of the Demand.

(b) The Demand shall be made on a standardized printed form. Copies of the printed Demand forms are available from the Patent and Trademark Office. Letters requesting printed forms should be marked "Box PCT".

(c) If the Demand is made prior to the expiration of the 19th month from the priority date and the United States of America is elected, the provisions of § 1.495 shall apply rather than § 1.494.

(d) Withdrawal of a proper Demand will not entitle applicant to a refund of the preliminary examination fee or handling fee.

19. A new Section 1.482 is added to read as follows:

§ 1.482 International preliminary examination fees.

(a) The following fees and charges for international preliminary examination are established by the Commissioner under the authority of 35 U.S.C. 376:

(1) A preliminary examination fee is due on filing the Demand:

(i) Where an international search fee as set forth in § 1.445(a)(2) has been paid on the international application to the United States Patent and Trademark Office as an International Searching Authority, a preliminary examination fee of, $370.00.

(ii) Where the International Searching Authority for the international application was an authority other than the United States Patent and Trademark Office, a preliminary examination fee of, $570.00.

(2) An additional preliminary examination fee when required, per additional invention:

(i) Where a supplemental search fee as set forth in § 1.445(a)(3) has been paid on the international application to the United States Patent and Trademark Office as an International Searching Authority, $125.00.

(ii) Where the International Searching Authority for the international application was an authority other than the United States Patent and Trademark Office, $190.00.

(b) The handling fee is due on filing the Demand. Any necessary supplement to the handling fee shall be paid directly to the International Bureau.

(35 U.S.C. 6, 376)

20. A new § 1.484 is added to read as follows:

§ 1.484 Conduct of international preliminary examination.

(a) An international preliminary examination will be conducted to formulate a non-binding opinion as to whether the claimed invention has novelty, involves an inventive step (is non-obvious) and is industrially applicable.

(b) No international preliminary examination report will be established prior to issuance of an international search report.

(c) No international preliminary examination will be conducted on inventions not previously searched by an International Searching Authority.

(d) The International Preliminary Examining Authority will establish a written opinion if any defect exists or if the claimed invention lacks novelty, inventive step or industrial applicability and will set a non-extendable time limit in the written opinion for the applicant to respond.

(e) If no written opinion under paragraph (d) of this section is necessary, or after any written opinion and the response thereto or the expiration of the time limit for response to such written opinion, an international preliminary examination report will be established by the International Preliminary Examining Authority. One copy will be submitted to the International Bureau and one copy will be submitted to the applicant.

(f) An applicant will be permitted a personal or telephone interview with the examiner, which must be conducted during the non-extendable time limit for response by the applicant to a written opinion. Additional interviews may be conducted where the examiner determines that such additional interviews may be helpful to advancing the international preliminary examination procedure. A summary of any such personal or telephone interview must be filed by the applicant as a part of the response to the written opinion or, if applicant files no response, be made of record in the file by the examiner.

21. A new § 1.485 is added to read as follows:

§ 1.485 Amendments by applicant during international preliminary examination.

The applicant may make amendments at the time of filing of the Demand and within the time limit set by the International Preliminary Examining Authority for response to any written opinion. Any such amendments must—

(1) Be made by submitting a replacement sheet for every sheet of the application which differs from the sheet it replaces unless an entire sheet is cancelled and

(2) Include a description of how the replacement sheet differs from the replaced sheet.

If an amendment cancels an entire sheet of the international application, that amendment shall be communicated in a letter.

22. A new § 1.487 is added to read as follows:

§ 1.487 Unity of invention before the International Preliminary Examining Authority.

(a) An international application before the International Preliminary Examining Authority will be considered to have unity of invention if the claims are in accordance with PCT Rule 13 (see § 1.475(f)).

(b) An international application containing claims to different categories of invention will be considered to have unity of invention if the claims are drawn only to one of the combinations of categories as set forth in PCT Rule 13.2 (see § 1.475(f)) or to the combination of—

(1) A product and a process for the manufacture of said product or

(2) A product and a process of use of said product.

If an application contains claims to more or less than one of the combinations of categories of invention set forth in PCT Rule 13.2 (see § 1.475(f)) or a combination set forth in paragraphs (b) (1) or (2) of this section, unity of invention may not be present.

(c) If an international application contains claims to a category of invention in addition to those categories included in any one of the combinations specified in paragraph (b) of this section, lack of unity of invention may be held between the categories included in the combination and the claims to the additional category of invention.

(d) Unity of invention will exist where the claims are limited to one of the combinations of categories set forth in PCT Rule 13.2 (see § 1.475(f)) or a combination set forth in paragraphs (b) (1) or (2) of this section. If multiple products, processes of manufacture or uses are claimed, the first invention of the category first mentioned in the claims of the application and the first recited invention of each of the other categories related thereto will be considered as the inventions to be examined. Any such holding by the examiner will be made of record as a holding of lack of unity of invention.

(e) The inventions recited by the claims of different categories must be related rather than independent inventions.

23. A new § 1.488 is added to read as follows:

§ 1.488 Determination of unity of invention before the International Preliminary Examining Authority.

(a) Before establishing any written opinion or the international preliminary examination report, the International Preliminary Examining Authority will determine whether the international application complies with the requirement of unity of invention as set forth in § 1.487.

(b) If the International Preliminary Examining Authority considers that the international application does not comply with the requirement of unity of invention, it may:

(1) Issue a written opinion and/or an international preliminary examination report, in respect of the entire international application and indicate that unity of invention is lacking and specify the reasons therefor without extending an invitation to restrict or pay additional fees. No international preliminary examination will be conducted on inventions not previously searched by an International Searching Authority.

(2) Invite the applicant to restrict the claims or pay additional fees, pointing out the categories of invention found, within a set time limit which will not be extended. No international preliminary examination will be conducted on inventions not previously searched by an International Searching Authority, or

(3) If applicant fails to restrict the claims or pay additional fees within the time limit set for response, the International Preliminary Examining Authority will issue a written opinion and/or establish an international preliminary examination report on the

main invention and shall indicate the relevant facts in the said report. In case of any doubt as to which invention is the main invention, the invention first mentioned in the claims and previously searched by an International Searching Authority shall be considered the main invention.

(c) Lack of unity of invention may be directly evident before considering the claims in relation to any prior art, or after taking the prior art into consideration, as where a document discovered during the search shows the invention claimed in a generic or linking claim lacks novelty or is clearly obvious, leaving two or more claims joined thereby without a common inventive concept. In such a case the International Preliminary Examining Authority may raise the objection of lack of unity of invention.

24. A new § 1.489 is added to read as follows:

§ 1.489 Protest to lack of unity of invention before the International Preliminary Examining Authority.

(a) If the applicant disagrees with the holding of lack of unity of invention by the International Preliminary Examining Authority, additional fees may be paid under protest, accompanied by a request for refund and a statement setting forth reasons for disagreement or why the required additional fees are considered excessive, or both.

(b) Protest under paragraph (a) of this section will be examined by the Commissioner or the Commissioner's designee. In the event that the applicant's protest is determined to be justified, the additional fees or a portion thereof will be refunded.

(c) An applicant who desires that a copy of the protest and the decision thereon accompany the international preliminary examination report when forwarded to the Elected Offices, may notify the International Preliminary Examining Authority to that effect any time prior to the issuance of the international preliminary examination report. Thereafter, such notification should be directed to the International Bureau.

25. A new § 1.491 is added preceded by a new heading to read as follows:

National Stage

§ 1.491 Entry into the national stage.

An international application enters the national stage when the applicant has filed the documents and fees required by 35 U.S.C. 371(c) within the periods set forth in § 1.494 or § 1.495.

26. A new § 1.492 is added to read as follows:

§ 1.492 National stage fees.

The following fees and charges for international applications entering the national stage under 35 U.S.C. 371 are established by the Commissioner under 35 U.S.C. 376:

(a) The basic national fee:

(1) Where an international preliminary examination fee as set forth in § 1.482 has been paid on the international application to the United States Patent and Trademark Office:

By a small entity (§ 1.9(f)) $150
By other than a small entity $300

(2) Where no international preliminary examination fee as set forth in § 1.482 has been paid to the United States Patent and Trademark Office, but an international search fee as set forth in § 1.445(a)(2) has been paid on the international application to the United States Patent and Trademark Office as an International Searching Authority:

By small entity (§ 1.9(f)) $170
By other than small entity $340

(3) Where no international preliminary examination fee as set forth in § 1.482 has been paid and no international search fee as set forth in § 1.445(a)(2) has been paid on the international application to the United States Patent and Trademark Office:

By a small entity (§ 1.9(f)) $225
By other than a small entity $450

(4) Where the international preliminary examination fee as set forth in § 1.482 has been paid to the United States Patent and Trademark Office and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness), and industrial applicability, as defined in PCT Article 33 (1) to (4) have been satisfied for all the claims presented in the application entering the national stage (see § 1.496(b)):

By a small entity (§ 1.9(f)) $25
By other than a small entity $50

(b) In addition to the basic national fee, for filing or later presentation of each independent claim in excess of 3:

By a small entity (§ 1.9(f)) $17
By other than a small entity $34

(c) In addition to the basic national fee, for filing or later presentation of each claim (whether independent or dependent) in excess of 20 (Note that § 1.75(c) indicates how multiple dependent claims are considered for fee calculation purposes.):

By a small entity (§ 1.9(f)) $6
By other than a small entity $12

(d) In addition to the basic national fee, if the application contains, or is amended to contain, a multiple dependent claim(s), per application:

By a small entity (§ 1.9(f)) $55
By other than a small entity $110

(If the additional fees required by paragraphs (b), (c) and (d) are not paid on presentation of the claims for which the additional fees are due, they must be paid or the claims cancelled by amendment, prior to the expiration of the time period set for response by the Office in any notice of fee deficiency.)

(e) Surcharge for filing the basic national fee or oath or declaration later than 20 months from the priority date pursuant to § 1.494(c) or later than 30 months from the priority date pursuant to § 1.495(c):

By a small entity (§ 1.9(f)) $55
By other than a small entity $110

(f) For filing an English translation of an international application later than 20 months after the priority date (§ 1.494(c)) or for filing an English translation of the international application or of any annexes to the international preliminary examination report later than 30 months after the priority date (§ 1.495 (c) and (e)), $26.00.

(35 U.S.C. 6, 376)

27. A new § 1.494 is added to read as follows:

§ 1.494 Entering the national stage in the United States of America as a Designated Office.

(a) Where no Demand has been filed with an appropriate International Preliminary Examining Authority by the expiration of 19 months from the priority date (see § 1.495), the applicant must fulfill the requirements of PCT Article 22 and 35 U.S.C. 371 within the time periods set forth in paragraphs (b) or (c) of this section in order to prevent the abandonment of the international application as to the United States of America. International applications for which those requirements are timely fulfilled will enter the national stage and obtain an examination as to the patentability of the invention in the United States of America.

(b) The applicant shall furnish to the United States Patent and Trademark Office not later than the expiration of 20 months from the priority date—

(1) A copy of the international application, unless it has been previously communicated by the International Bureau or unless it was originally filed in the United States Patent and Trademark Office;

(2) A translation of the international application into the English language, if

it was originally filed in another language;

(3) The basic national fee (see § 1.492(a)); and

(4) An oath or declaration of the inventor (see § 1.497).

(c) The applicant may furnish any required English translation of the international application, the basic national fee and the oath or declaration of the inventor after 20 months but not later than the expiration of 22 months from the priority date. The payment of the processing fee set forth in § 1.492(f) is required for acceptance of an English translation later than the expiration of 20 months after the priority date. The payment of the surcharge set forth in § 1.492(e) is required for acceptance of the basic national fee or the oath or declaration of the inventor later than the expiration of 20 months after the priority date.

(d) A copy of any amendments to the claims made under PCT Article 19, and a translation of those amendments into English, if they were made in another language, must be furnished not later than the expiration of 20 months from the priority date. Amendments under PCT Article 19 which are not received by the expiration of 20 months from the priority date will be considered to be cancelled.

(e) Verification of the translation of the international application or any other document pertaining to an international application may be required where it is considered necessary, if the international application or other document was filed in a language other than English.

(f) The documents and fees submitted under paragraphs (b) and (c) of this section must be clearly identified as a submission to enter the national stage under 35 U.S.C. 371, otherwise the submission will be considered as being made under 35 U.S.C. 111.

(g) The time limits set out in paragraphs (b), (c) and (d) of this section may not be extended pursuant to § 1.136 or otherwise.

(h) An international application becomes abandoned as to the United States 20 months from the priority date if a copy of the international application is not communicated to the Patent and Trademark Office prior to 20 months from the priority date where the United States has been designated but not elected prior to 19 months from the priority date. If a copy of the international application is communicated within 20 months to the Patent and Trademark Office, an international application will become abandoned as to the United States 22 months from the priority date if the required English translation(s), fees and oath or declaration under 35 U.S.C. 371(c) are not filed within 22 months from the priority date.

28. A new § 1.495 is added to read as follows:

1.495 Entering the national stage in the United States of America as an Elected Office.

(a) Where a Demand has been filed with an appropriate International Preliminary Examining Authority and not withdrawn by the expiration of 19 months from the priority date, the applicant must fulfill the requirements of 35 U.S.C. 371 within the time periods set forth in paragraph (b) or (c) of this section in order to prevent the abandonment of the international application as to the United States of America. International applications for which those requirements are timely fulfilled will enter the national stage and obtain an examination as to the patentability of the invention in the United States of America.

(b) The applicant shall furnish to the United States Patent and Trademark Office not later than the expiration of 30 months from the priority date—

(1) A copy of the international application, unless it has been previously communicated by the International Bureau or unless it was originally filed in the United States Patent and Trademark Office;

(2) A translation of the international application into the English language, if it was originally filed in another language;

(3) The basic national fee (see § 1.492(a)); and

(4) An oath or declaration of the inventor (see § 1.497).

(c) The applicant may furnish any required English translation of the international application, the basic national fee and the oath or declaration of the inventor after 30 months but not later than the expiration of 32 months from the priority date. The payment of the processing fee set forth in § 1.492(f) is required for acceptance of an English translation later than the expiration of 30 months after the priority date. The payment of the surcharge set forth in § 1.492(e) is required for acceptance of the basic national fee or the oath or declaration of the inventor later than the expiration of 30 months after the priority date.

(d) A copy of any amendments to the claims made under PCT Article 19, and a translation of those amendments into English, if they were made in another language, must be furnished not later than the expiration of 30 months from the priority date. Amendments under PCT Article 19 which are not received by the expiration of 30 months from the priority date will be considered to be cancelled.

(e) A translation into English of any annexes to the international preliminary examination report, if the annexes were made in another language, must be furnished not later than the expiration of 30 months from the priority date. Translations of the annexes which are not received by the expiration of 30 months from the priority date may be submitted within 32 months from the priority date accompanied by the processing fee set forth in § 1.492(f). Translations of the annexes which are not timely received will be considered to be cancelled.

(f) Verification of the translation of the international application or any other document pertaining to an international application may be required where it is considered necessary, if the international application or other document was filed in a language other than English.

(g) The documents submitted under paragraphs (b) and (c) of this section must be clearly identified as a submission to enter the national stage under 35 U.S.C. 371, otherwise the submission will be considered as being made under 35 U.S.C. 111.

(h) The time limits set out in paragraphs (b), (c), (d) and (e) of this section may not be extended pursuant to § 1.136 or otherwise.

(i) An international application becomes abandoned as to the United States 30 months from the priority date if a copy of the international application is not communicated to the Patent and Trademark Office prior to 30 months from the priority date and a Demand for International Preliminary Examination which elected the United States of America has been filed prior to the expiration of 19 months from the priority date. If a copy of the international application is communicated within 30 months to the Patent and Trademark Office, an international application will become abandoned as to the United States 32 months from the priority date if the required English translation(s), fees and oath or declaration under 35 U.S.C. 371(c) are not filed within 32 months from the priority date.

29. A new § 1.496 is added to read as follows:

§ 1.496 Examination of international applications in the national stage.

(a) International applications which have complied with the requirements of 35 U.S.C. 371(c) will be taken up for action based on the date on which such

requirements were met. However, unless an express request for early processing has been filed under 35 U.S.C. 371(f), no action may be taken prior to one month after entry into the national stage.

(b) A national stage application filed under 35 U.S.C. 371 may have paid therein the basic national fee as set forth in § 1.492(a)(4) if it contains, or is amended to contain, at the time of entry into the national stage, only claims which have been indicated in an international preliminary examination report prepared by the United States Patent and Trademark Office as satisfying the criteria of PCT Article 33(1)–(4) as to novelty, inventive step and industrial applicability. Such national stage applications in which the basic national fee as set forth in § 1.492(a)(4) has been paid may be amended subsequent to the date of entry into the national stage only to the extent necessary to eliminate objections as to form or to cancel rejected claims. Such national stage applications in which the basic national fee as set forth in § 1.492(a)(4) has been paid will be taken up out of order.

30. A new § 1.497 is added to read as follows:

§ 1.497 Oath or declaration under 35 U.S.C. 371(c)(4).

(a) When an applicant of an international application, if the inventor, desires to enter the national stage under 35 U.S.C. 371 pursuant to § 1.494 or § 1.495, he or she must file an oath or declaration in accordance with § 1.63.

(b) If the international application was made as provided in § 1.422, 1.423 or 1.425, the applicant shall state his or her relationship to the inventor and, upon information and belief, the facts which the inventor is required by § 1.63 to state.

31. A new § 1.499 is added to read as follows:

§ 1.499 Unity of invention during the national stage.

(a) An international application which has entered the national stage by meeting the requirements of 35 U.S.C. 371 will be considered to have unity of invention if the claims are in accordance with PCT Rule 13 (see § 1.475(f)).

(b) An application in the national stage containing claims to different categories of invention will be considered to have unity of invention if the claims are drawn only to one of the combinations of categories as set forth in PCT Rule 13.2 (see § 1.475(f)) or to the combination of—

(1) A product and a process for the manufacture of said product or

(2) A product and a process of use of said product.

If an application contains claims to more or less than one of the combinations of categories of invention set forth in PCT Rule 13.2 (see § 1.475(f)) or a combination set forth in paragraphs (b)(1) and (2) of this section, unity of invention may not be present.

(c) If an application in the national stage contains claims to a category of invention in addition to those categories included in any one of the combinations specified in paragraph (b) of this section, lack of unity of invention may be held between the categories included in the combination and the claims to the additional category of invention.

(d) Unity of invention will exist in an application in the national stage where the claims are limited to one of the combinations of categories set forth in PCT Rule 13.2 (see § 1.475(f)) or a combination set forth in paragraph (b)(1) or (2) of this section. If multiple products, processes of manufacture or uses are claimed, the first invention of the category first mentioned in the claims of the application and the first recited invention of each of the other categories related thereto will be considered as the elected invention to be examined. Any such holding of an election by the examiner will be made in the form of a restriction requirement which confirms the election made by the presentation of the claims. Such a restriction requirement would be made on the basis of whether the inventions are independent and distinct. Applicant has the right to traverse such a restriction requirement in the response to the Office action in which the election is indicated.

(e) The inventions recited by the claims of different categories must be related rather than independent inventions.

(f) If the examiner finds that a national stage application lacks unity of invention, the examiner may in an Office action require the applicant in the response to that Office action to elect the invention to which the claims shall be restricted, this official action being called a requirement for restriction. Such requirement may be made before any action on the merits but may be made at any time before the final action at the discretion of the examiner. Review of any such requirement is provided under §§ 1.143 and 1.144.

Dated: April 28, 1987.

Donald J. Quigg,

Assistant Secretary and Commissioner of Patents and Trademarks.

[FR Doc. 87–11977 Filed 5–27–87; 8:45 am]

BILLING CODE 3510–16–M

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State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 826-4500 Ext. 21
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage Municipal Libraries	(907) 264-4481
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7609
Arkansas	Little Rock: Arkansas State Library	(501) 371-2090
California	Irvine: University of California, Irvine Library	(714) 856-7234
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	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse*	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2122
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
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	Miami–Dade Public Library	(305) 375-2665
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis–Marion County Public Library	(317) 269-1741
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library & Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4284
Nebraska	Lincoln: University of Nebraska-Lincoln, Engineering Library	(402) 472-3411
Nevada	Reno: University of Nevada Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7815
New Mexico	Albuquerque: University of New Mexico Library	(505) 277-5441
New York	Albany: New York State Library	(518) 474-7040
	Buffalo and Erie County Public Library	(716) 846-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Philadelphia: Free Library	(215) 686-5330
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3138
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Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Vanderbilt University Library	(615) 322-2775
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	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
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Wisconsin	Madison: Kurt F. Wendt Engineering Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

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*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF April 25, 1987

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	2-06-86
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	2-15-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	1-30-86
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-06-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	6-25-85
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	10-19-84
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	3-26-84
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	11-4-85
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	3-29-85
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	4-08-85
DESIGN, GROUP 290—K. L. CAGE, Director	1-07-85
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	2-14-86
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	4-08-85
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	7-22-85
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	12-12-85
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	6-02-86

Expiration of patents: The patents within the range of numbers indicated below expire during April 1987, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,504,377 to 3,509,578, inclusive

Plant Patents ..... Numbers 2967 to 2969, inclusive

REEXAMINATIONS

JUNE 16, 1987

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 3,500,938 (707th)

UNIVERSALLY MOUNTED DRILLING MAST

John V. Watson, Fort Worth, Tex., assignor to Watson Manufacturing Company, Fort Worth, Tex.

Reexamination Request Nos. 90/000,768, Apr. 26, 1985 and 90/001,094, Sep. 24, 1986.

Reexamination Certificate for Patent No. 3,500,938, issued Mar. 17, 1970, Ser. No. 751,002, Jul. 23, 1968.

Continuation of Ser. No. 619,671, Mar. 1, 1967, abandoned.

Int. Cl.[4] E21C *11/02, 5/00, 9/00*

U.S. Cl. 173—40

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1–4 are cancelled.

[1. A drill rig and universally mounted drilling mast comprising:

a support base;

means engaging said base for rotation of a section thereof about a substantially vertical axis;

means engaging said base for reciprocation of said section thereof along a substantially horizontal axis;

a mast carried by said support base;

a rotary table carried by said support base for rotating a kelly and drill bit;

a driven gear and shaft carried by said support base and secured horizontally to a bottom region of said mast, which is adapted to rotate relative to said shaft and gear between elevated, working positions and a lowered, non-working position;

a drive gear and shaft carried by said support base to transversely engage said driven gear;

a rotatable sleeve carried by said support base concentrically relative to said drive gear and shaft;

power means supported by said base and communicating with said drive gear and shaft;

drive means connecting said driven gear and shaft with said rotary table;

two fluid powered cylinders having their upper ends connected with said mast and their lower ends spaced outwardly and rearwardly from said mast and connected with said support base; and

control means connected separately with each of said cylinders to enable rotation of said mast about said driven gear shaft and said drive gear shaft.]

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

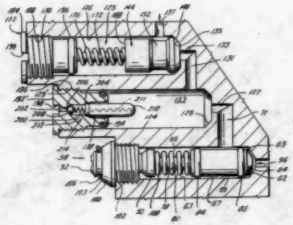
Re. 32,438
WELL PACKER VALVE ARRANGEMENT

Edward T. Wood, Kingwood, and Robert E. Snyder, Houston, both of Tex., assignors to Completion Tool Company, Houston, Tex.

Original No. 4,402,517, dated Sep. 6, 1983, Ser. No. 408,123, Aug. 13, 1982. Application for reissue Jun. 21, 1984, Ser. No. 622,958

Int. Cl.[4] F16J *15/46*; E21B *33/12*

U.S. Cl. 277—34 **7 Claims**



1. A tubular system for use in packing off a well bore, comprising:

a [hollow] tubular mandrel;

[a packer] *an inflatable packing element* attached to said mandrel at one end of said mandrel;

a valve collar mounted on the other end of said mandrel, the other end of said [packer] *packing element* being attached to said *valve* collar [and], *said valve collar* having a passageway *means* therethrough, [and] *said passageway means in* said *valve* collar being in fluid communication with *the interior of* said [packer] *packing element* and the interior and exterior of said mandrel [by said passageway];

at least two valve pocket means in said passageway means in said valve collar;

[said passageway having enlarged portions in said collar;

a valve system mounted in said enlarged portions, said valve system including three valves;]

[the first of said valves being mounted in the first of said portions and having] *first valve means in a first valve pocket means and including* a reciprocating *valve* member and [a] stop means for preventing reciprocation of said reciprocating *valve* member *from a first position to a second position* prior to the application of at least a predetermined difference in pressure between one [side] *end* of said reciprocating *valve* member and the other [side,] *end of said reciprocating valve member,* said reciprocating *valve* member being located *in said first position* at one *open* end of a first part of said passageway *means* when said stop means prevents reciprocation and having at least two *spaced apart* seals [thereon] *which are disposed so that the one open end is between said seals* for preventing the flow of fluid from either end of said reciprocating *valve* member around *the seals on* the *reciprocating valve* member to said [first] *one open end of the first part of said* passageway [part] *means;*

said first valve *pocket means* being in fluid communication [with a second part of said passageway in fluid communication] with [said] *the* interior of said mandrel [on] *and* one side [of] *of one seal on* said reciprocating *valve* member;

said first valve *pocket means* being in fluid communication with [said] *the* exterior of said mandrel [on the other] *and one* side of *the other seal on* said reciprocating *valve* member; and

[the second of said valves having check means] *second valve means in a second valve pocket means* for permitting the flow of fluid *in one direction* from [said] *the* exterior of said mandrel to said *one open end of the* first part of said passageway [when the pressure exterior of said mandrel exceeds the pressure in said second portion] *means between the seals;*

said second [portion includes] *valve pocket means including* a first bore [opening] *which opens* to [said] *the* exterior of said mandrel and [said second] *check* valve [is] *means* located in said first bore;

said second valve [includes] *pocket means having*

a [head adapted to connect] *retainer housing connected* to said first bore,

a seal mounted on said [head] *retainer housing* and sealingly engaging the [walls] *wall* of said first bore and said [head] *retainer housing,*

[and] said check *valve* means [is] *being* mounted in said [head] *retainer housing;*

said check *valve* means [includes] *including:*

a second bore through said [head and] *retainer housing* substantially coaxial with said first bore;

a third bore through a portion of said [head] *retainer housing* substantially coaxial with said first and second bores, said third bore being of a greater diameter than said second bore and forming a shoulder therewith;

a ball adapted to seal against said shoulder; and

mounting means for reciprocably mounting said ball in said third bore.

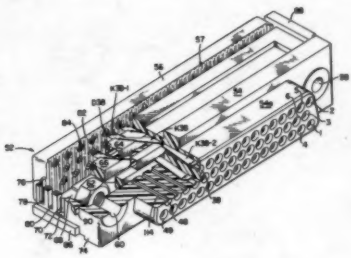
Re. 32,439
THREE-ROW CONNECTOR FOR MASS TERMINATING FLAT CABLE

Ronald S. Narozny, Panorama City, Calif., assignor to Thomas & Betts Corporation, Raritan, N.J.

Original No. 4,437,723, dated Mar. 20, 1984, Ser. No. 221,396, Dec. 30, 1980. Application for reissue Oct. 29, 1984, Ser. No. 665,828

Int. Cl.[4] H01R *4/24*

U.S. Cl. 439—404 **25 Claims**



11. An electrical connector for insulation-piercing termination of flat multiconductor cable, said connector comprising an elongate housing and electrical contact elements supported in said housing in first and second laterally spaced parallel rows, each said contact element comprising a member integrally defining opposed first and second end portions, said first end portions being of insulation-piercing type, there being different spacings in said first row between the first and second end

portions of contact elements at opposite ends of said first row defining thereby a configuration of said first row asymmetrical at said opposed ends thereof, the configuration of said first row being the mirror-image of the configuration of said second row, *said first and second contact element rows having respective corresponding contact elements, corresponding laterally opposed second end portions thereof being in corresponding row positions, said connector including further such contact elements supported in said housing in a third longitudinally extending row, laterally between said first and second rows and parallel therewith, said first end portions of contact elements of said first, second and third rows being in different longitudinal positions.*

Re. 32,440

VACUUM CIRCUIT INTERRUPTER

Yoshiyuki Innami, Tokyo, and Takahumi Hashimoto, Higashiminemachi, both of Japan, assignors to Kabushiki Kaisha Meidensha, Tokyo, Japan

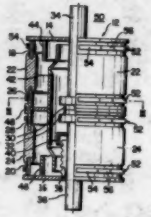
Original No. 4,306,128, dated Dec. 15, 1981, Ser. No. 132,421, Mar. 21, 1980. Application for reissue Oct. 27, 1982, Ser. No. 437,144

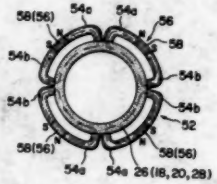
Claims priority, application Japan, Mar. 23, 1979, 54-34608; Apr. 14, 1979, 54-46261; Apr. 18, 1979, 54-52231[U]; Apr. 24, 1979, 54-54925[U]

Int. Cl.⁴ H01H *33/66*

U.S. Cl. 200—144 B **12 Claims**

16. A vacuum-type electric circuit interrupter comprising an evacuated envelope including a tubular portion of electrically insulating material, a pair of relatively movable contacts disposed within said envelope, at least one metallic tube of magnetic material connected to said tubular portion of insulating material, said tube having a tendency to be magnetostrictive, and means for substantially eliminating the magnetostrictive tendency of said metallic tube, said eliminating means comprising a magnetic flux generating member for supplying a magnetic flux to and along said metallic tube such that the density of the magnetic flux in a portion of said metallic tube reaches a saturation level, and a mounting member for mounting said magnetic flux generating member on said envelope.





PATENTS

GRANTED JUN. 16, 1987

ERRATA

For CLASS	See PATENT NO.
132-090	4,672,986
439-021	4,673,228
439-207	4,673,229
439-133	4,673,230
439-587	4,673,231
439-441	4,673,232
439-442	4,673,233
439-469	4,673,234
439-536	4,673,235
439-609	4,673,236
439-607	4,673,237
439-890	4,673,238
439-746	4,673,239
439-755	4,673,240
354-322	4,673,251
350-096	4,673,270
106-098	4,673,659
526-253	4,673,712
033-178	4,673,890
336-092	4,673,907
380-014	4,673,975
369-046	4,674,070
369-048	4,674,071
369-052	4,674,072

PATENTS

GRANTED JUNE 16, 1987

GENERAL AND MECHANICAL

4,672,689

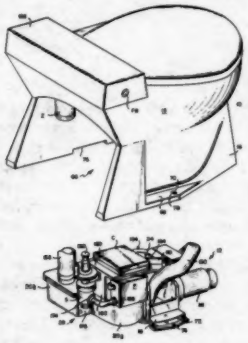
WATER SAVING TOILET SYSTEM

Walter O. Heinze, Swathmore, Pa., and Wesley M. Tufts, Holliston, Mass., assignors to Control Fluidics, Inc., Greenwich, Conn.

Division of Ser. No. 147,484, May 7, 1980, Pat. No. 4,333,185. This application Nov. 12, 1981, Ser. No. 320,457

Int. Cl.[4] E03D *1/00*

U.S. Cl. 4—415 **9 Claims**



1. The method of disposing of effluent in a toilet system with a minimum expenditure of flush water wherein the toilet system comprises a bowl, a valve for supplying flush water to the bowl, an attrition chamber to which the effluent in the bowl is transferred by a motor-driven discharge pump connected to the attrition chamber and motor-driven hydraulic attrition means within the attrition chamber for effecting hydraulic attrition of the solid matter of the effluent comprising maintaining a predetermined level of water in the bowl and a predetermined level of effluent in the attrition chamber and effecting a sequential operation wherein a predetermined volume of treated effluent is pumped from the attrition chamber into a waste pipe and a corresponding volume of flush water is delivered to the bowl, and wherein pumping the effluent from the attrition chamber effects an evacuation of the effluent from the bowl.

4,672,690

VACUUM TANK CONSTRUCTION FOR SELF-CONTAINED SEWAGE HANDLING APPARATUS

James Sigler, Perrysville, Ohio, assignor to Sealand Technology, Inc., Big Prairie, Ohio

Filed Jan. 24, 1986, Ser. No. 822,237

Int. Cl.[4] E03D *11/02, 11/18*

U.S. Cl. 4—423 **20 Claims**

1. A sewage handling system comprising:

a toilet having a discharge portion at the bottom thereof;

a vacuum tank connected to said discharge portion of said toilet and having an outlet at the bottom of said vacuum tank;

a vacuum switch operatively connected to said vacuum tank and operatively communicating with the interior thereof;

a vacuum pump operatively connected by a conduit to said vacuum tank outlet, and operatively controlled by said vacuum switch; and

baffle means mounted within said vacuum tank and operatively surrounding said vacuum tank outlet, for preventing passage of large, non-degraded objects from said vacuum tank toward said pump.

4,672,691

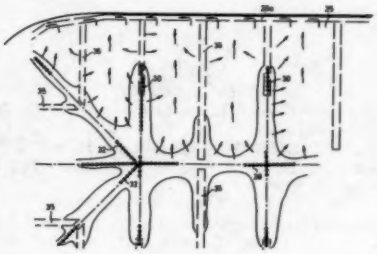
BULK VOLUME FERMENTER

Claude De Garie; Albert Cocci, and Robert C. Landine, all of Fredericton, Canada, assignors to Adi Limited, New Brunswick, Canada

Filed Dec. 6, 1985, Ser. No. 805,801

Int. Cl.[4] E04H *3/19*

U.S. Cl. 4—499 **16 Claims**



1. For use with a fermentation pond, a cover and gas-collection system comprising:

a gas-impermeable membrane resistant to the elements and resistant to chemical deterioration by both the contents of the pond and any biogas generated by fermentation in the pond, the membrane overlying substantially the full surface of the pond,

a biogas collection conduit positioned at the surface of the pond and under the membrane,

weight means positioned so as to urge the membrane downwardly along a plurality of lines separated from each other and a plurality of rows of floats positioned between adjacent lines of weight means so as to define between the lines a plurality of channels along which biogas can pass to the collection conduit,

the floats supporting off the surface of the pond the portions of the membrane adjacent the floats, to ensure that the membrane if ruptured will not sink, and

aspirating means for exhausting the gaseous contents of the collection conduit.

4,672,692

BATH WITH AIR JET

Nigel C. Savage, 4, Shelley Gardens, Hinckley, Leicestershire, LE10 1TA, England

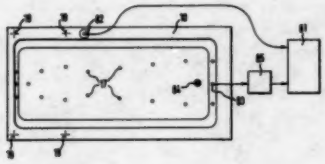
Filed Mar. 11, 1986, Ser. No. 638,550

Int. Cl.[4] B01F *3/04;* **A47K** *3/00*

U.S. Cl. 4—543 **11 Claims**

1. Aeration equipment for a bath comprising a plurality of

nozzles which can be arranged to project through the base of the bath, means for supplying air to said nozzles and means



responsive to the passage of water out of the bath to actuate the air supplying means.

4,672,693

SITTING BATHTUB

Inga-Lena Schenström, 6 Första Kyrkvägsgränd, Norrköping, Sweden (S-602 10)

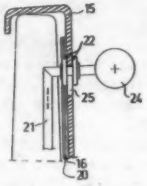
PCT No. PCT/SE85/00006, § 371 Date Sep. 10, 1985, § 102(e) Date Sep. 10, 1985, PCT Pub. No. WO85/02990, PCT Pub. Date Jul. 18, 1985

PCT Filed Jan. 9, 1985, Ser. No. 776,041

Claims priority, application Sweden, Jan. 10, 1984, 8400091

Int. Cl.[4] A47K *3/02*

U.S. Cl. 4—555 **8 Claims**



1. A bathtub having a bottom and a surrounding side wall which together from an open-topped container having an upper edge, the side wall and upper edge having an opening through which a person may enter and leave the bathtub, a separate, manually maneuverable hatch which is free of connection to the bathtub so as to be selectively placed inside and outside the bathtub by the user, said hatch having an upper edge provided with an inverted U-shaped edge capable of hooking over and contacting the edge of the bathtub and allowing play toward and away from said side wall, said hatch having dimensions greater than the dimensions of said opening so that when placed inside the bathtub the edge portion of said hatch overlies the edge portion of said opening whereby said hatch covers said opening; a seal between the edge portion of said hatch and the edge portion of said opening, said hatch and bathtub being so shaped that upon mounting said hatch inside said bathtub in overlying relationship to said opening sufficient sealing contact is obtained initially at the lower edge of said opening to close a gap which exists between said edge portion of said opening and said seal so that water when entering the bathtub exerts further pressure on said hatch, which pressure successively extends upwards as the water rises in the bathtub thereby completing sealing of the edge portion of said hatch to the edge portion of said opening.

4,672,694

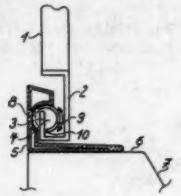
MOVEABLE LOWER GUIDE FOR SLIDING DOORS

Heinz Dusar, Unterer Kümmelsbergweg 19, 5450 Neuwied 14, Fed. Rep. of Germany

Filed Aug. 6, 1986, Ser. No. 893,664

Int. Cl.[4] A47H *15/00*

U.S. Cl. 4—607 **7 Claims**



1. In a shower stall having at least one door element, with at least one end thereof being suspended in an upper, horizontal frame portion of a fixed frame in such a way as to be movably guided on a rail via rollers or slides, while the other, lower end of each door element is provided with a first extension having an upwardly angled piece that extends into a downwardly open recess of a bottom rail that forms a further horizontal frame portion of the fixed frame, the improvement wherein: said bottom rail, to help define said recess for said angled piece, includes a wall portion that faces said door element and the interior of said shower stall, with this wall portion being supported on the remainder of said bottom rail, and being movable relative thereto, in such a way that this wall portion can be shifted from a first position, in which said wall portion overlaps said angled piece of said first extension of said door element, and prevents pivoting of said door in a direction transverse to its plane into a second position which permits a pivoting of said door element, transverse to its plane, in the direction toward the interior of said shower stall, and from said second position back into said first position.

4,672,695

UPHOLSTERED FURNITURE

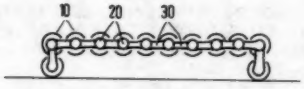
Rainer Fuss, Hoelderlinstrasse 7, D-7000 Stuttgart 1, Fed. Rep. of Germany

Filed Nov. 8, 1985, Ser. No. 796,556

Claims priority, application Fed. Rep. of Germany, Nov. 8, 1984, 3440793

Int. Cl.[4] A47D *11/00*; A47C *17/00*

U.S. Cl. 5—2 R **10 Claims**



1. Upholstered furniture of the type having a number of cylindrical padding elements, mounted on bearing shafts, with the ends of said bearing shafts on both sides of said padding elements being positioned immediately adjacent to one another and connected together by straps in a manner similar to an open bicycle chain with the ends of said connecting straps each being provided with a series of angularly spaced apart holes arranged in a circle pivoting on the bearing shafts, and being adjustable at set angles with respect to one another by means of a positioning element equipped with pins, said pins being able to engage in the holes of the ends of adjacent connecting straps when such holes are aligned, said ends being mounted on a bearing shaft, and, to adjust the angular position of the con-

necting straps, said pins being also retractable characterized in that

the connecting ends (31) of the connecting straps (30) are each pivoted on a bearing bush (32) which is connected at one end to the bearing shaft (11) by means of a threaded connection (12, 35),

the other end of the bearing bush (32) is equipped with a stop collar (33) and a tool seat (34),

a base plate (27), fixed to the bearing bush (32) so that the plate rotates, is supported on the stop collar (33),

a compression spring (29) which presses the connecting ends (32) of the corresponding connecting straps (30) against a retainer (14) at the end of the bearing shaft (11) by means of a hollow, cylindrical supporting block (36) is pressed over the bearing bush (32) following the base plate (27),

a cap shaped positioning element (22) has a compartment which is open on one side and which contains the bearing shaft (32), the base plate (27), the compression spring (29) and the supporting block (36), the cap shaped element further has a base which is equipped with an opening (23) to provide access to the tool seat (34) of the bearing bush (32),

an additional compression spring (25) is braced against the base plate (27), the other end of said compression spring being held in the area of the open side of the compartment by means of a supporting plate (24), and

the base plate (27) is provided with shoulders (28) around the circumference, dogs (26) formed on the compartment protruding between said shoulders, said dogs extending, starting from the base of the cap, only a portion of the depth of the compartment in the positioning element (21).

4,672,696

CONVERTIBLE SITTING/RECLINING FURNITURE ARTICLE

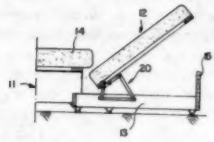
Franz Horenkamp, Bielefeld, Fed. Rep. of Germany, assignor to Ferdinand Lusch GmbH & Co. KG., Bielefeld, Fed. Rep. of Germany

Filed Mar. 13, 1986, Ser. No. 839,134

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1985, 8509131[U]

Int. Cl.[4] A47C *17/04*

U.S. Cl. 5—17 **2 Claims**



1. A sitting furniture article convertible into a reclining furniture article, comprising, in combination

a main frame;

a seat element;

means for supporting said seat element at a predetermined elevation above ground;

a bed frame which can be pulled out of, and pushed into said main frame in a drawer-like manner, including a front side, a rear said, and two lateral sides;

an extension element;

means for mounting said extension element on said bed frame for displacement between a retracted position through an intermediate position to an extended position, in which extended position said extension element is disposed at said predetermined elevation to form an extension of said seat element, said mounting means including a five-bar kinematic linkage at each of said lateral sides of said bed frame, said five-bar kinematic linkage being operable in successive first and second four-bar kinematic linkage phases, each of said five-bar kinematic linkages including

a steering lever pivotally mounted at a first region of said extension element, and at a first portion of said bed frame, and arranged close to said front side of said bed frame, and

two steering links arranged more remotely from said front side of said bed frame than said steering lever, adjacent to said steering lever, and pivotably connected to one another at a connection region,

one of said steering links being pivotally connected to a second region of said extension element at a predetermined distance from said first region, while the other of said steering links is pivotally connected to a second portion of said bed frame which is spaced from said first portion by a prearranged distance exceeding said predetermined distance,

said steering links assuming a straight-line orientation with respect to one another in the extended position of said extension element to lock said connection region against pivoting in at least one pivoting direction thereof,

two abutment pins stationarily mounted on said extension element and on said bed frame, respectively, at regions of the respective steering links, and in directions towards said steering lever, and away from said steering links, and

a tension spring connected at each of said kinematic linkages with one end thereof at said first region of said extension element, and with the other end thereof at said connecting region of said steering links,

whereby, upon said extension element being pivotally moved in said first phase from said retracted position frontwise to said intermediate position in a first angular direction, said one of said steering links is constrained to follow movement of said extension element until the other of said steering links abuts one of said abutment pins, being temporarily immobilized thereby, so that, upon reaching said intermediate position and subsequent pivotable movement of said extension element in a second angular direction opposite to said first angular direction towards said extended position in said second phase, said spring urges said connecting region towards said steering lever, and said one of said steering links is constrained to move in said first angular direction until it abuts the other of said abutment pins, at which time said second steering link points in a direction similar to that of said first steering link, and said extension element has reached said extended position;

while in an actuated return movement of said extension element rearwise from said extended position to said intermediate position in said first angular direction, said one of said steering links is caused to assume a direction different from that of the other of said first steering links, and thereafter, upon movement of said extension element further rearwise, and away from said intermediate position, said one of said steering links is again constrained to follow movement of said extension element, until said extension element has reached said retracted position.

4,672,697

TILTING EXERCISE BED ACTUATED BY A LINEAR ELECTROMECHANICAL DEVICE

Ernesto Schürch, Via Ionio 21, Battipaglia, Italy

Filed Oct. 25, 1985, Ser. No. 791,463

Claims priority, application Italy, Oct. 25, 1984, 49067 A/84

Int. Cl.[4] A61G *7/00*; A47C *21/00*; B65H *1/00*

U.S. Cl. 5—62 **4 Claims**

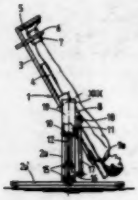
1. A tilting bed for a patient performing physical therapies, such as muscular restoration, in particular with respect to abdominal and dorsal muscles, comprising:

a frame supporting a padded plate to receive the patient, said frame being pivotally supported for tilting about a transverse center tilting axis of said bed by two pairs of opposed stationary supporting uprights, the uprights of each

pair being vertically and parallelly spaced apart from one another, and being parallel to a longitudinal center plane of the bed, so as to define therebetween a vertical sliding race, the tilting of said frame with the padded plate being performed by an electromechanical device, wherein the electromechanical device comprises:

an electrical actuator having a vertically reciprocating sliding rod, said rod being moved up and down by said actuator, said actuator being fixedly mounted on the outer side of one pair of the uprights, near the upper ends of said one pair of the uprights;

a vertically sliding bracket member, comprising a wheeled bracket having a horizontal L-shaped cross section and having two vertical flanges, one of said flanges being disposed perpendicular to the longitudinal center plane of



the bed and the other of said flanges carrying parallel horizontal shafts of at least two wheels slidably mounted in said sliding race defined between the uprights, said bracket being connected to the lower end of the reciprocating sliding rod of the actuator; and

a connecting bar pivotally connected at its lower end to the other flange of the bracket, said other flange of the bracket being disposed parallel to the longitudinal center plane of the bed, the upper end of the bar being pivotally connected at a corresponding side of the frame, at a point spaced apart from the tilting axis of said frame by such distance so as to cause the frame with the padded plate to be rotatable about said tilting axis of the frame by an angle of about 120° with respect of the stationary pairs of supporting uprights.

4,672,698

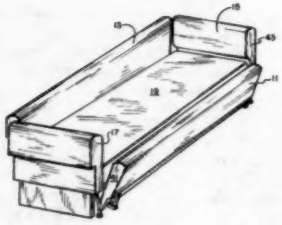
BED RAIL CUSHION SYSTEM

Donald F. Sands, 2701 Chapel Pike, Marion, Ind. 46952

Filed Feb. 7, 1986, Ser. No. 826,984

Int. Cl.[4] A47C *27/08*

U.S. Cl. 5—424 **13 Claims**



1. In combination with a patient's bed of the type having a mattress and a pair of siderails each movable between a lowered position for facilitating patient ingress and egress and a raised position for preventing a patient from inadvertently falling out of bed, a bed rail cushion including at least two like siderail pads, each siderail pad having an inverted generally "J" shaped cross-sectional configuration with an inner relatively rigid frame defining a cavity for receiving a bed siderail and a resilient padding surrounding the frame, the pad being removably positioned on the bed with the siderail within the cavity and movable with the siderail between said lowered and raised positions, the padding being of a thickness sufficient to firmly abut the lateral edge of the mattress completely filling the gap between the rail and the mattress when the pad is positioned on the siderail and the siderail is in a raised position.

4,672,699

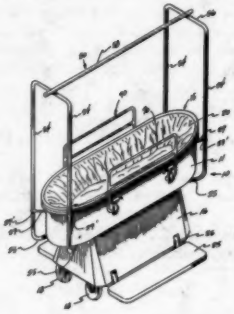
FLUIDIZED PATIENT SUPPORT SYSTEM WITH SIDE RAIL ASSEMBLY

Vernon L. Goodwin, Charlotte, N.C., assignor to Support Systems International, Inc., Charleston, S.C.

Division of Ser. No. 571,557, Jan. 17, 1984, Pat. No. 4,564,965. This application Nov. 12, 1985, Ser. No. 796,780

Int. Cl.[4] A47C *21/08*; A61G *7/00*

U.S. Cl. 5—430 **5 Claims**



1. A patient support system comprising:

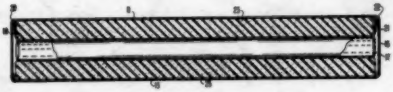
(a) means on which to receive a patient in a supine position, said means including a side support means; and

(b) a side rail assembly associated with said side support means, said side rail assembly comprising a rail arrangement including elongated spread apart rails having crossing rails secured therebetween, said elongated spaced apart rails defining a locking pin receiving opening therein and laterally extending transverse sections at a lower end of same, mounting brackets secured to said side support means, said brackets including a locking pin channel and a generally U shaped lower end in which said transverse sections are receivable, said channel having an end plate defining an opening therethrough, and a locking pin received in said channel under spring tension, a forward end of said pin having a bevel thereat and normally residing outside said channel, and an opposite end of said pin having means thereon for engaging said end plate to hold said pin in an inactive position, whereby said rail arrangement is pivotal about said U shape lower end of said mounting bracket to a raised position where said elongated rails engage said beveled forward ends of said pins and bias said pins against said spring tension partially through said channel until said pin matches with said receiving opening on said rail and moves within same to lock said rail assembly in the raised position, and whereby when said pins are withdrawn from said pin receiving openings, said rail arrangement may be lowered.

4,672,700
ANTIDECUBITIS CUSHION

George W. Poncy, Singer Island, Fla., assignor to Steridyne Corporation, Riviera Beach, Fla.

Filed Mar. 13, 1985, Ser. No. 711,102
Int. Cl.[4] A47C 20/02
U.S. Cl. 5—441 12 Claims

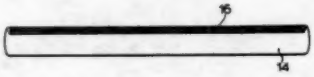


1. A cushion comprising a cover including a gusset, a top panel sealed to said gusset around the perimeter of said top panel and a bottom panel sealed to said gusset around the perimeter of said bottom panel, a bladder at least partly filled with liquid within said cover, an elastomeric slab sandwiched between said bladder and said top panel, said bladder having extension panels on opposite sides thereof sandwiched between said elastomeric slab and said gusset and sealed to said cover where said top panel is sealed to said gusset.

4,672,701
POLYPROPYLENE FIBER BAFFLE FOR WATERBED MATTRESS

Andre Kocsis, Toronto, Canada, assignor to Halcyon Waterbed Inc., Downsview, Canada

Filed Sep. 22, 1986, Ser. No. 909,600
Claims priority, application Canada, Feb. 25, 1986, 502633
Int. Cl.[4] A47C 27/08; B32B 1/00; D04H 1/58
U.S. Cl. 5—450 25 Claims



1. In a waterbed mattress comprising a water inflatable bag-like member and wave dampening means in said member, the improvement wherein said wave dampening means comprises a resiliently deformable bonded fiber product of unwoven fibers bonded together with a binder, the fiber product having a specific gravity in the range of 0.9 to 0.999,

the unwoven fibers comprising polypropylene fiber.

4,672,702
ARTICLES OF BEDDING WITH STRETCH FIT ENDS

Barbara K. Isham, 13118 Kimberly, Houston, Tex. 77079

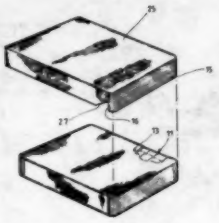
Filed Dec. 17, 1984, Ser. No. 682,345
Int. Cl.[4] A47G 9/04
U.S. Cl. 5—497 9 Claims

1. A bedding article for use with a rectangular mattress, having opposing head and foot ends, comprising:

a fabric panel of substantially rectangular shape nominally exceeding the width of the mattress, measured parallel to said head and foot ends, plus twice the depth of the mattress in width,

said fabric panel having at each corner of said foot end substantially rectangular cutouts forming at each foot end corner a first edge non-parallel to the foot end of said fabric panel and a second edge parallel to said foot end;

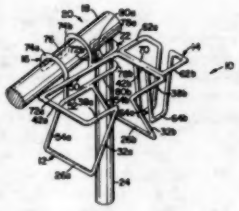
a substantially rectangular stretch panel having two long sides and two ends attached along one long side to the foot end and to said first edges of said fabric panel and along each end of said stretch panel to said second edges of said fabric panel so as to form a box-like construction defined on the top and each side by said fabric panel and on the end by said stretch panel wherein said stretch panel extends a nominal distance beyond the corners of said box end.



4,672,703
METHOD AND APPARATUS FOR HOLDING AN ELECTRICAL DEVICE PROXIMATE TO A SIDE RAIL OF A BED

Clifton L. Frazier, 1213 Selby Ave., St. Paul Park, Minn. 55071

Continuation-in-part of Ser. No. 595,309, Mar. 30, 1984, abandoned. This application Jul. 3, 1985, Ser. No. 752,372
Int. Cl.[4] A47C 21/00; A47B 96/06
U.S. Cl. 5—503 6 Claims



1. An apparatus suitable for hanging on a substantially horizontal member of a side rail of a bed for holding a television controller having a television controller body and a television controller cord and a call button having a call button body and a call button cord, comprising:

(a) a first basket suitable for receiving the television controller body, said first basket including a first bent metal wire configured in a first shape substantially conforming to the television controller body, said first shape forming a first cord aperture for accommodating the television controller cord;

(b) a second basket connected to said first basket suitable for receiving the call button body, said second basket including a second bent metal wire configured in a second shape substantially conforming to the call button body, said second shape forming a second cord aperture for accommodating the call button cord;

(c) a first rail clip connected to said first basket suitable for hanging on the substantially horizontal member of the side rail, said first rail clip including a third bent metal wire configured in a third shape substantially conforming to the substantially horizontal member of the side rail; and

(d) a resilient outer layer coated on said baskets and said first rail clip, wherein the television controller and call button are held in position proximate to the side rail of the bed, wherein the side rail includes a substantially vertical member connected to the substantially horizontal member, and wherein the apparatus further comprises a second rail clip connected to said first rail clip suitable for engaging the substantially vertical member, said second rail clip includ-

ing a fourth bent metal wire configured in a fourth shape substantially conforming to the substantially vertical member of the side rail, and said resilient outer layer is coated on said second rail clip.

4,672,704

FRAME ASSEMBLY FOR COLLECTING ROYAL JELLY

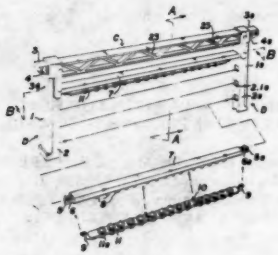
Soon Y. Hong, and Keum P. Hong, both of Av. Amores 1126, Dep. 201, Colonia del Valle, Mexico (D.F. 12)

Filed Nov. 21, 1985, Ser. No. 800,216

Claims priority, application Rep. of Korea, Jan. 22, 1985, 7020[U]

Int. Cl.[4] A01K *47/02*

U.S. Cl. 6—10 **7 Claims**



7. A plastic frame, especially for collecting royal jelly, said frame comprising in combination:

a top frame member, said top frame member being adapted to be horizontally disposed in a beehive and having at each one of its respective ends means for engaging and locking, wherein said engaging means include at least a wedge formation which tapers at least on one side, and said locking means include at least one locking lip;

at least two vertically disposable side member assemblies, with each one of said side member assemblies being adapted to be engaged by the respective end of said top frame member in such a way that they can be connected thereto by any insert mode, but which precludes the removal of a respective side member assembly without deformation of said at least one locking lip; and

at least one holder for a plurality of cups for storing royal jelly, said holder being connectable with its ends at and between said side member assemblies to extend substantially parallel with respect to said top frame member.

4,672,705

PROCESS FOR APPLYING CONTROLLED AMOUNTS OF LIQUIDS TO A RECEPTIVE MATERIAL WEB

Hans Bors, Fällanden; Peter Egger, Cham; Albert Götz, Oetwil a.d. Limmat, and Martin Schwemmer, Urdorf, all of Switzerland, assignors to Triatex International AG, Switzerland

Filed Oct. 5, 1984, Ser. No. 657,900

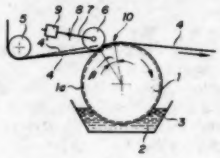
Claims priority, application European Pat. Off., Oct. 7, 1983, 83810466.9

Int. Cl.[4] D06B *1/14*

U.S. Cl. 8—151 **15 Claims**

1. A process of continuous and uniform application of controlled amounts of treating liquor to an advancing, liquid receptive material web, comprising the steps of passing said material web over a counter-roll having a resilient but non-skidding surface and then passing said web in supported web condition onto an applicator roll having a metallic cylinder surface which has been dipped in a vat of treating liquor and is carrying a uniform liquor film, and rotating said applicator roll and counter-roll in the same directions, and using control means to control the amount of treating liquor on said web, whereby said material web is supplied in a continuous and uniform manner with amounts of treating liquor not exceeding the liquid saturation of said web;

the treating liquor being a foam forming liquor, before using a particular treating liquor, testing the treating liquor for foam formation and rejecting the liquor if it does not satisfy the test, the testing of the treating liquor for foam formation comprising placing 100 units of volume of the treating liquor in a mixing container having a scale divided into 250 units of volume, rotating the container at a speed of 0.5 rotation per second for five rotations and then halting the rotation, upon halting the rotation, measuring



the volume of treating liquor sample and foam in the container, then 15 seconds later, measuring the volume of treating liquor sample and foam in the container a second time, and 30 seconds after the first measurement, measuring the volume of treating liquor sample and foam in the container a third time; adding the three measured combined volume readings of treating liquor and foam, and comparing that added sum with a preset standard value of 350 units of volume to determine that the sum is below that preset standard value, and rejecting the treating liquor if the test is not met.

4,672,706

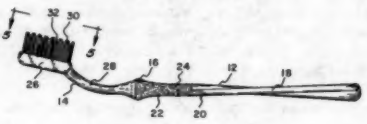
TOOTHBRUSH

Percy H. Hill, Silver Lake, N.H., assignor to Stratford Laboratories, Englewood Cliffs, N.J.

Filed Dec. 27, 1985, Ser. No. 813,748

Int. Cl.[4] A46B *9/04*

U.S. Cl. 15—167 R **11 Claims**



6. A toothbrush comprising:

a handle member and a head member including a brush;

said head member including an elongated narrow neck portion connecting said brush to the forward end of said handle member, said neck portion being curved upwardly so that said brush is located approximately between 10° and 15° above the longitudinal axis of said handle member;

said handle member being rectangular in cross section throughout a substantial portion thereof, said rectangular cross-sectional portion being twisted about its longitudinal axis whereby each face of said rectangular cross-sectional portion is offset from itself by an angle of approximately 45° from one end to the other thereof;

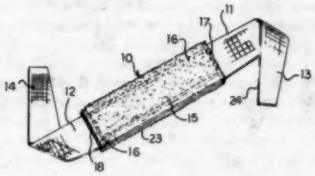
said handle member having a substantially larger cross-sectional configuration at its forward end where it connects to said head member and including a transitional portion which tapers downwardly from said forward end to said rectangular cross-sectional portion, the outer surface of said transitional portion being textured to provide a non-slip gripping surface thereon.

4,672,707

WASHING DEVICE

Arnold W. Johnson, 420 Heller Rd., #311, Menomonie, Wis. 54751

Filed Oct. 13, 1981, Ser. No. 310,533
Int. Cl.[4] A47K 7/03
U.S. Cl. 15—222 **14 Claims**



1. A washing device for cleansing and massaging a body of a user, said device comprising an initially expansible wash body member for the releasable absorption of washing fluids and a pair of opposing handle members extending from said wash body member for the manipulation of said wash body member by a user of said device, said wash body member being a flexible, composite structure having a flexible, elongated, opposing wall structured encasement member with an interior surface area and essentially having a unitary, initially compressed-in-thickness, liquid-expansible sponge member juxtaposed within said encasement member, said sponge member being a compressed-in-thickness cellulose material which expands in thickness upon the initial contact to washing fluids to approximately four times its original, compressed thickness, said opposing wall structures of said encasement member having exterior surfaces for contact with a body of a user, said opposing handle members of said device being flexible, elongated structures being fastened to and extending from said wash body member in generally the elongated direction thereof, each said handle member having outer end portions for grasping by a user of said device, whereby, upon initial contact of said wash body member to washing fluids said initially compressed sponge member thereof expands in thickness within said encasement member, and by expanding against the interior surface area of said encasement member, to form a cushioned wash body for washing and massaging a body of a user of said device.

4,672,708

MIRROR WIPER ASSEMBLY WITH MANUALLY OPERATED REMOTE CONTROL

Harold L. Williams, 6484 W. 1100 S. 35, Marion, Ind. 46952

Filed Mar. 6, 1986, Ser. No. 836,836
Int. Cl.[4] B60S 1/14, 1/20
U.S. Cl. 15—250 B **4 Claims**

1. A wiper assembly for a rear view mirror, said assembly comprising:

a frame independently mountable on a rear view mirror;

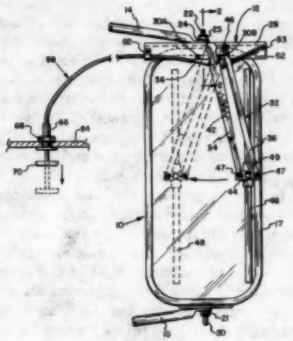
a wiper arm mechanism having a first arm and a second arm arranged in parallel and operable between a rest position and a stop position, each of said first and second arms having a free end and a first end, said first ends being pivotably secured to said frame;

at least one wiper blade;

a connecting link connected to said first arm and second arm free ends, said wiper blade being coupled to said connecting link at a point located generally intermediate the ends of the blade;

a return spring connected between said frame and said wiper arm mechanism to bias said mechanism to said rest position;

a manually operated remote control means for actuating said wiper arm mechanism from said rest position to said stop position, said control means having a manually operable actuator, a first end connected to said wiper arm mechanism and a second end connected to said manually operable actuator; and,



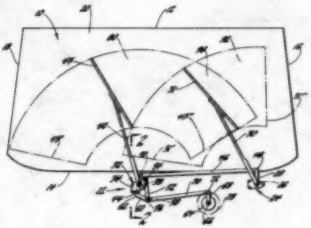
pivot means for pivoting said arm mechanism and a pair of stops for said mechanism wherein said frame is an L-shaped bracket with a centrally positioned slot for mounting on a rear view mirror frame, and said stops and said pivot means are mounted on said bracket.

4,672,709

WINDSHIELD WIPER DRIVE

Joseph P. Licata, Dayton, and David P. Kudla, Kettering, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 19, 1985, Ser. No. 810,736
Int. Cl.[4] B60S 1/24
U.S. Cl. 15—250.27 **1 Claim**



1. In a wiper system for a vehicle windshield having a passenger's side and a driver's side and a driver's primary vision area, said wiper system including a first wiper blade supported on said vehicle for pivotal movement about a first axis below said driver's side of said windshield and a second wiper blade supported on said body for pivotal movement about a second axis below said windshield and to the passenger's side of said first axis, a drive for said wiper system comprising, a motor driven crank arm disposed as said body for unidirectional rotation, a transverse drive link below said windshield with one end pivotally connected to said motor driven crank arm so that said drive link linearly reciprocates through constant length strokes proportional to the length of said motor driven crank arm during rotation of the latter, an elongated drive plate connected to said second wiper blade and rotatable as a unit therewith about said second axis having a first end disposed on one side of said second axis and a second end disposed on the opposite side of said second axis from said first end, linkage means including a ground link pivotally connected to

each of said vehicle and the other end of said drive link and a connecting link pivotally connected to each of said ground link and said drive plate first end operative to angularly oscillate said passenger's side wiper blade through an included angle proportional to the stroke of said drive link whereby said second wiper blade wipes a first arc on said windshield having an inner limit adjacent said windshield lower edge to the passenger's side of said primary vision area and an outer limit on the opposite side of said primary vision area from said inner limit, a driver's side crank arm connected to said first wiper blade and rotatable as a unit therewith about said first axis, and a transverse operating link having one end pivotally connected to said second end of said drive plate and the other end pivotally connected to said driver's side crank arm so that said operating link is reciprocated by said drive plate in linear strokes proportional to said included angle of said wiper blade, said operating link angularly oscillating said first wiper blade in tandem with said second wiper blade through an included angle proportional to the linear stroke of said operating link so that said first wiper blade wipes a second arc on said windshield having a inner limit adjacent said windshield lower edge to the passenger's side of said primary vision area and an outer limit adjacent said windshield driver's side edge on the opposite side of said primary vision area from said inner limit whereby said primary vision area receives a double wipe during each tandem stroke of said first and second wiper blades.

4,672,710

SINGLE PRESSURE VESSEL CLEANING SYSTEM

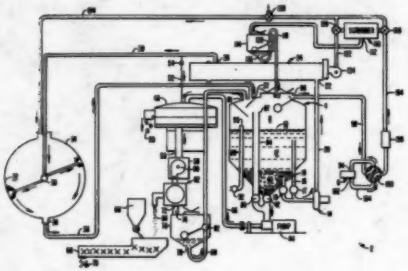
William G. Urbani, Stockton, Calif., assignor to Industrial Innovations, Inc., Stockton, Calif.

Filed Aug. 19, 1985, Ser. No. 767,004

The portion of the term of this patent subsequent to Aug. 21, 2001, has been disclaimed.

Int. Cl.[4] B08B *9/08*

U.S. Cl. 15—302 **18 Claims**



17. A tank cleaning system comprising:

a tank to be cleaned;

a substantially sealed pressure vessel having a liquid outlet, a vacuum outlet and first and second suction inlets in fluid communication with the interior of said vessel, said vacuum outlet and said first and second suction inlets communicating with an upper region of said vessel interior and said liquid outlet communicating with a lower region of said vessel interior;

first pump means, fluidly connected to said liquid outlet, for pumping a cleaning liquid from said vessel through a first line, said liquid partially filling said pressure vessel so that said vacuum outlet and suction inlets are above the free surface of said cleaning liquid;

vacuum means, fluidly connected to said vacuum outlet, for drawing a partial vacuum within said pressure vessel;

means for heating said cleaning liquid passing through said first line;

means, fluidly connected to said first line, for directing said liquid cleaner at the interior of the tank to be cleaned thereby dislodging contaminants therefrom;

a second line fluidly connected to said second suction inlet at one end and to the interior of the tank at its other end whereby the partial vacuum within said vessel produces suction at said other end to suck said liquid cleaner and dislodged contaminants from the tank into said vessel;

solids separator means, including a liquid outlet, for removing solids from a mixture of solids and liquids;

pipe means for fluidly connecting an inlet of said solids separator means to said vessel, said pipe means adapted to pass a mixture of solids and said cleaning liquid from said vessel to said solids separator means;

a centrifuge having a centrifuge inlet fluidly connected to the solids separator means liquid outlet, a fine solids outlet and a centrifige liquid outlet, the centrifuge liquid outlet fluidly coupled to the upper region of said vessel interior for passage of liquid from said centriguge liquid outlet into said vessel; and

a blender/extruder means, operably connected to the fine solids outlet and a source of bulk solidification medium, for creating disposal cake.

4,672,711

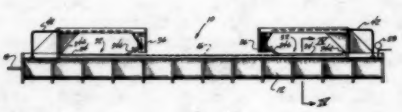
VACUUM EXTRACTION APPARATUS

Paul W. Mickler, Spartanburg, S.C., assignor to E-Vac, Inc., Spartanburg, S.C.

Filed Nov. 29, 1985, Ser. No. 802,972

Int. Cl.[4] F26B *13/30*

U.S. Cl. 15—306 A **4 Claims**



1. An automatic vacuum sealer adapted to be used with a longitudinally slotted vacuum pipe of a fabric-treating machine over which fabric is passed to have liquid compositions extracted therefrom to provide a desired liquid composition content therein, said vacuum sealer comprising an elongate flexible element, means for securing one end of the element to a vacuum pipe adjacent one end of the longitudinal slot thereof with the element extending along a length of the end portion of the slot for adjustable sealing engagement therewith, fluid-operated motor means having a movable member attached to the other end of the elongate flexible member, conduit means operatively connected to the motor means for attachment to the vacuum pipe in communication with the interior thereof, and means for mounting the motor means adjacent the vacuum pipe whereby variations in vacuum in the the vacuum pipe move the movable member to proportionally vary its pulling force on the elongate flexible element in its movement into and out of sealing engagement with the vacuum slot.

4,672,712

WIND RESTRAINING STAY ROLLER ASSEMBLY FOR SLIDING DOORS

Ralph G. Stevenson, Elma, Iowa, assignor to Lynn B. Stevenson, Elma, Iowa

Filed Dec. 23, 1985, Ser. No. 812,903

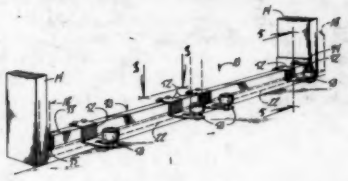
Int. Cl.[4] E05D *15/06*

U.S. Cl. 16—91 **13 Claims**

8. In combination with a building having a floor, a door frame defining a door opening with opposite sides, and a slidable door having upper and lower edges and opposite front and back sides, said door being supported at its upper edge for lateral movement between open and closed positions with respect to the door frame, a device for preventing forward and

backward movement of the closed door with respect to the door frame, comprising:

elongated channel means completely spanning said door frame and said door frame opening above and adjacent to said floor and having opposite ends; said channel means includes an elongated bar having opposite ends, at least one roller horizontally spaced apart from said bar so as to define a gap between said bar and said roller, and bracket



means for connecting said roller to said bar in a spaced apart relation and for supporting said roller for rotation about a vertical axis; and

securement means for releasably securing said opposite ends of said elongated bar to respective sides of said door frame;

said lower edge of said door being received in said gap when said door is in said closed position whereby forward and backward movement of said door is prevented.

4,672,713

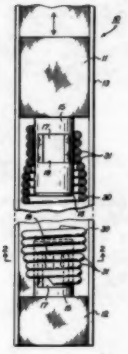
SPRING COUPLER FOR BLOCK AND TACKLE WINDOW BALANCE SYSTEM

William P. Newton, Spencerport, and Robert S. Flight, Rochester, both of N.Y., assignors to Caldwell Manufacturing Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 810,564, Dec. 19, 1985, abandoned. This application Aug. 4, 1986, Ser. No. 892,371

Int. Cl.[4] E05F *1/00*

U.S. Cl. 16—197 **22 Claims**



1. A coupler for connecting end regions of different sizes of coiled tension springs to components of block and tackle window balance systems, said different sizes of coiled tension springs supplying different spring forces, each larger than a respective system balance force by a factor of the number of working cord reaches in the block and tackle, said coupler comprising:

a. a hollow tube having a snug fit within terminal coils of the smallest inside diameter of said sizes of coiled tension springs, other sizes of said coiled tension springs with larger inside diameters having said terminal coils necked-down to fit said tube;

b. a wall of said tube having an opening with an abrupt edge axially spaced from an end of said tube, said edge being at least twice as long as the largest wire diameter used in said sizes of coiled tension springs; and

c. one of said coiled tension springs being connected with said tube by having at least one of said terminal coils of said connected spring indented into said opening to a depth of more than one-half the wire diameter of said connected spring so that said indented coil interlocks with said edge and keeps said connected spring from slipping off said tube.

4,672,714

DOOR HINGE FOR MOTOR VEHICLES OR THE LIKE

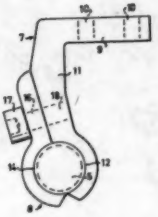
Frans Bos, Kungälv, Sweden, assignor to AB Volvo, Goteborg, Sweden

Filed Apr. 17, 1986, Ser. No. 853,047

Claims priority, application Sweden, Apr. 26, 1985, 8502044

Int. Cl.[4] E05D *11/08*

U.S. Cl. 16—262 **2 Claims**



1. Door hinge for motor vehicles or the like comprising two hinge halves which are pivotally connected to each other by means of an essentially cylindrical pivot pin, the first hinge half comprising a C-bracket, between the legs of which the pivot pin is permanently mounted, the second hinge half consisting of a bracket portion and a clamping member, which by means of at least one fastener is releasably joined to the bracket portion, said bracket portion and clamping member being provided with facing and partially abutting surfaces and defining together a channel for receiving the pivot pin, characterized in that the facing surfaces of the bracket portion and the clamping member are mirror-symmetrical to each other and each comprise a substantially semicylindrical recess, said recesses forming the channel for the pivot pin, said pivot pin comprising a fixed pin and a rotatable but axially non-displaceable sleeve surrounding the pin and adapted to be securely but releasably clamped in the channel when the bracket portion and the clamping member are joined to each other.

4,672,715

HINGE ASSEMBLY

John R. Beckwith, Rochester Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 15, 1985, Ser. No. 755,150

Int. Cl.[4] E05D *11/10*

U.S. Cl. 16—334 **3 Claims**

1. In an improved hinge assembly for use with an automotive vehicle or the like having a door supported by said hinge assembly on a body structure for movement between closed and open positions,

said hinge assembly including a stationary hinge member adapted to be secured to said body structure,

a movable hinge member adapted to be secured to said door,

means pivotally connecting said movable hinge member to said stationary hinge member for movement about a pivot axis between closed and at least one hold open position,

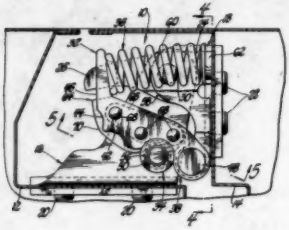
hold open means for releasably holding said movable hinge member in said hold open position, said hold open means

including a detent member movably supported on one hinge member and having an edge including an arcuate surface that defines a detent notch,

cam means supported by the other hinge member, and movable relative to said detent member as said movable hinge member moves about said pivot axis, said cam means including a first portion engageable with said detent member edge,

and spring means carried by said one hinge member and operatively connected to said detent member to bias said detent member edge into engagement with said cam means first portion,

the engagement of said cam means first portion with said detent member edge moving said detent member in opposition to the biasing force of said spring means as said cam means moves relative to said detent member as said movable hinge member approaches its hold open position until said cam means first portion is adjacent said detent notch, whereupon said spring means moves said detent notch arcuate surface into engagement with said cam means first



portion to releasably hold said movable hinge member in its hold open position, the improvement comprising;

an elastomer dampening pad secured to said detent member and having a surface adjacent to and vertically spaced from said detent member edge, said dampening pad surface further having a first portion that is horizontally spaced from and generally matches the shape of said detent edge and a second portion adjacent to said detent notch that is horizontally spaced from said detent member edge by a greater amount than said first dampening pad portion, and,

a second portion on said cam means adjacent to and vertically spaced from said detent member edge that is lightly frictionally engageable with said dampening pad surface first portion, said cam means second portion sinking into and compressing said dampening pad surface second portion when said movable hinge member moves into its hold open position, thereby dampening and cushioning the movement of said detent member so that a smoother movement of said hinge member is obtained.

4,672,716

MEAT TENDERIZING APPARATUS

Rosalie J. Dickey, 8311 Nunley Dr., Baltimore, Md. 21234

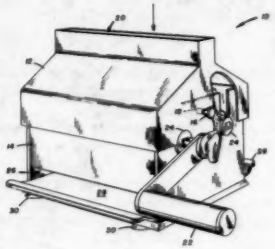
Continuation of Ser. No. 583,687, Feb. 27, 1984, abandoned. This application Jan. 21, 1986, Ser. No. 820,092

Int. Cl.[4] A22C *9/00*

U.S. Cl. 17—26 **5 Claims**

1. Apparatus for tenderizing meat comprising,

a pair of removable roller assemblies, each roller assembly of said pair of roller assemblies having at least one gear, wherein said one gear of each of said pair of roller assemblies meshes with said at least one gear of the other of said roller assembly of said pair of roller assemblies, a cutting means, said cutting means being an alternating series of a plurality of spacers and a plurality of bladed disks, each bladed disk of said plurality of bladed disks having a plurality of cutting edges, a portion of said plurality of bladed disks being assembled on each of said pair of roller assemblies; a pair of axles, a pair of roller bearing assemblies for mounting each of said roller assemblies on their respective axle of said pair of axles; each of said pair of roller bearing assemblies including a removable axle and two removable roller bearings secured to opposite ends of each axle, the axle of one of the pairs of roller assemblies having an extension; a housing, said housing comprising a base with a horizontal slot and a removable cover having a slot therein through which meat is inserted, said removable cover having at least vertically arranged side and end walls for substantially enclosing said pair of roller assemblies and said plurality of bladed disks, spring load knobs attached to said cover and recesses in said base which are engaged by said spring loaded knobs, for securing said



cover to said base, said end walls having corresponding vertically arranged slots therein for receiving the removable axles of said pair of removable roller assemblies; feed guides attached to said cover and extending toward said pair of roller assemblies from said slots for grinding said meat;

a crank handle, a thumb screw means, said thumb screw means attaching said crank handle to the extension of one of said pair of roller assemblies outside said housing for driving said pair of roller assemblies such that said cutting means tenderizes said meat inserted through said slot;

a receiving tray positioned in said horizontal slot and from which said receiving tray is drawn and a means in said tray for receiving said meat from said pair of roller assemblies.

4,672,717

APPARATUS FOR SWINGING NIPPER FRAME OF COMBER

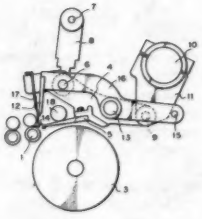
Manabu Shimomura, Gifu, Japan, assignor to Kabushikikaisha Hara Shokki Seisakusho, Gifu, Japan

Filed Jul. 8, 1986, Ser. No. 883,347

Claims priority, application Japan, Jul. 13, 1985, 60-153394

Int. Cl.[4] D01C *19/14*

U.S. Cl. 19—225 **2 Claims**



1. An apparatus for swinging a nipper frame of a comber, which includes a nipper frame arranged above a combing

cylinder of the comber and having a cushion plate on its front end; a nipper shaft arranged for reciprocating rotation to a machine frame of the comber at the top of said nipper frame; a nipper frame setting fulcrum provided on said machine frame at the top of said nipper frame and more forward than said nipper shaft; a nipper frame driving arm fired at its top end to said nipper shaft and pivoted at its bottom end to a nipper frame driving fulcrum located at the back of said nipper frame; and a nipper frame swing arm with a top end pivoted to said nipper frame setting fulcrum and bottom end pivoted to a nipper frame swing fulcrum located at the front of said nipper frame.

4,672,718

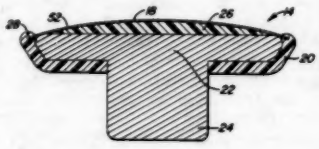
GOLD-CROWNED DOMED GARMENT BUTTON AND MANUFACTURING METHOD

Gary R. Schlueter, Castro Valley; Karsten K. Kettlitz, San Leandro, both of Calif., and Louis F. Arnone, III, 9 Pleasant View Rd., Novato, Calif. 94947, assignors to Louis F. Arnone, III, Novato, Calif.

Filed Mar. 21, 1985, Ser. No. 714,715

Int. Cl.[4] A44B *1/04*

U.S. Cl. 24—90 A **9 Claims**



1. A crowned, domed garment button for use with a garment, comprising

an attachment member for attaching said garment button to said garment, said attachment member having a first surface and a periphery, wherein said attachment member is manufactured from a first material;

a backing member mounted to said attachment member first surface, said backing member having a second surface that is distal of said attachment member, wherein said backing member is manufactured from a second material;

a convex, imperforate facing plate mounted to said backing member second surface, said facing plate having a periphery that is at least coextensive and in contact with said attachment member periphery, wherein said facing plate is manufactured from a third material; and

a rim member mounted to both said facing plate periphery and said attachment member periphery, wherein said facing plate periphery is embedded within said rim member, and further wherein said rim member, manufactured from said second material, accentuates said facing plate.

4,672,719

UPHOLSTERY BUTTON

Gregory C. Scott, Auckland, New Zealand, assignor to Development Finance Corporation of New Zealand, Auckland, New Zealand

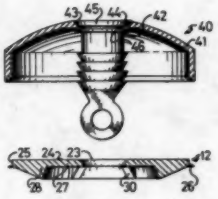
Continuation-in-part of Ser. No. 596,302, Apr. 3, 1984, abandoned. This application Mar. 19, 1986, Ser. No. 841,665

Claims priority, application New Zealand, Apr. 14, 1983, 203886

Int. Cl.[4] A44B *1/12*

U.S. Cl. 24—113 R **9 Claims**

1. A button assembly including an outer body component of plastics material, a recess in said outer body component, a shank of plastics material extending from within the recess of said outer body component and anchored thereto, and an inner body component of plastics material adapted to be substantially non-releasably snap-fitted into the recess of said outer body component about said shank; wherein the inner body component comprises an annular washer having a peripheral rim which is an interference fit in said recess of said outer body component, a substantially flat inner face which in use faces towards the recess of the outer body component, a contoured



outer face, an aperture through said washer through which the shank projects, and an annulus of reduced thickness about said aperture terminating in a region of maximum thickness which tapers towards the peripheral rim of the washer to define the contoured outer face.

4,672,720

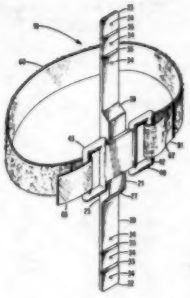
FASTENING APPARATUS

Theodore V. Lorenzetti, Stoneham, Mass., assignor to Corflex, Inc., Winchester, Mass.

Filed Mar. 31, 1986, Ser. No. 846,031

Int. Cl.[4] A44B *11/00*

U.S. Cl. 24—163 R **1 Claim**



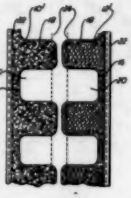
1. A fastener for a bi-valve cast comprising, a base, having oppositely extending flexible ends, each of said ends having means for fixedly securing the base to a separate portion of the cast, a buckle, the buckle having a coupling means for detachably securing the buckle to the central portion of the base, and a strap, for encircling the cast, coupled at one end to one end of the buckle and adjustably connected at its other end to the opposite end of the buckle, the coupling means including a detachable, rotatable clasp, for coupling and rotatably orientating the buckle and the strap to the base such that the buckle and the strap are rotatably adjustable to the proper orientation to fasten the cast.

4,672,721

STRIP FASTENER MATERIAL

George A. Provost, Litchfield, N.H., assignor to Actief N.V. ABN Trust Company (Curacao) N.V., Willemstad Curacao, Netherlands Antilles

Filed May 20, 1986, Ser. No. 865,057
Int. Cl.[4] A44B *18/00*
U.S. Cl. 24—442 5 Claims



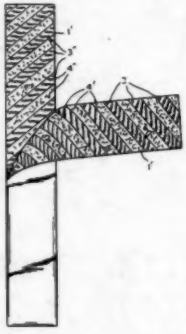
1. A separable fastener comprising two complementary flexible strips each having a surface defining a plurality of seperable fastener elements, the elements on the surfaces releasably engaging one another when the surfaces are brought together in an at least a partially overlapping manner to separably hold the strips together, each strip being configured as a narrow strip having a like plurality of evenly spaced projections extending sideways in the plane of its said surface.

4,672,722

SINGLE TAPE CLOSURE CONSTRUCTION

Josef Malamed, Rochelle Park, N.J., assignor to JMW Textiles, New York, N.Y.

Filed Apr. 28, 1986, Ser. No. 856,466
Int. Cl.[4] A44B *18/00*
U.S. Cl. 24—446 8 Claims



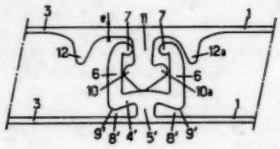
1. A tape fastener construction comprising: a backing member, a plurality of alternating strips of hook and pile members on one side of said backing member, where each strip is disposed at approximately the same acute angle with respect to the longitudinal edge of the tape, said tape being adapted to be cut so as to provide two separate fastener to be fastened together in reversed orientation to each other.

4,672,723

STABILIZED RECLOSABLE EXTRUDED PLASTIC FASTENERS

Gilbert P. J. M. Hugues, Ville D'Avray, France, and Steven Ausnit, New York, N.Y., assignors to Minigrip, Inc., Orangeburg, N.Y.

Filed May 27, 1986, Ser. No. 866,917
Claims priority, application France, Nov. 4, 1985, 8516295
Int. Cl.[4] A44B *21/00*; B65D *33/16*
U.S. Cl. 24—587 26 Claims



1. A reclosable extruded plastic fastener for joining sheet material such as the walls of bags, and comprising:

a grooved female profile having a broad base and a thin and relatively short stem extending from the base for connecting the base in closely spaced relation to a material sheet area, said base having at least one shoulder spaced laterally from said stem for stopping engagement with the sheet area for limiting rocking of the female profile on said stem, and groove-defining fastener arm means on and projecting away from said base and having fastener jaw hook means directed into the groove of this profile;

said stem by its short and thin structure minimizing the thermal bridge between said female profile base and said sheet for improving the differential cooling between said profile and film during extrusion;

a male profile having a barbed head complementary to and reclosably interengagable with said fastener hook means in the groove of said female profile by pressing said profiles toward one another for closing the fastener, an attachment leg for connecting the male profile head to a material sheet area, and rib structure at opposite sides of, and spaced laterally relative to said head, and the spacing of said rib structure at one side of said head being substantially closer to said head than the spacing relative to the head of the rib structure at the opposite side of the head; and

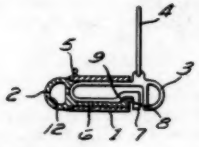
said shoulder and said rib structure cooperating for facilitating fitting together of said female and said male profiles by maintaining the profiles against relative lateral displacement when pressing said profiles together for closing the fastener.

4,672,724

LOCK FOR ORNAMENTAL JEWELRY CHAIN

Ferdinando Grotto, Bassano del Grappa, Italy, assignor to Oroamerica, Inc., Burbank, Calif.

Filed May 21, 1986, Ser. No. 865,370
Int. Cl.[4] A44B *11/25*
U.S. Cl. 24—616 5 Claims



1. A fastener for jewelry chain which comprises:

a hollow housing element including first and second opposed ends;

a first fastener element comprising a first clasp and an elongated element extending therefrom having a hook portion thereon, said first fastener element being adapted to be fixed externally to the first end of said housing element so that said first clasp is affixed to a first end of, and external of, said housing element, and said elongated element and hook portion is affixed internally within said housing element;

a second moveable fastener element comprising a second clasp and a U-shaped tang including first and second ends thereof extending therefrom, said tang having a resilient portion thereof containing a notch complementary to said hook portion of said first fastener element whereby:

(a) fastening of said fixed and moveable fastener elements takes place when said resilient U-shaped tang is compressed, inserted within said housing element until said hook portion and notch are in alignment, and then decompressed, to thereby cause insertion of said hook portion into said notch and fastening of said fixed and moveable fastener elements; and

(b) unfastening of said fixed and said moveable fastener elements takes place when said resilient U-shaped tang is again compressed, and said moveable fastener element is moved outwardly from said fixed fastener element; and

means for externally fixing the first fastener element to the first end of the hollow housing element.

4,672,725

SNAP BUCKLE

Kazumi Kasai, Namerikawa, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed Jun. 6, 1986, Ser. No. 871,247

Claims priority, application Japan, Jun. 6, 1985, 60-85659[U]; Dec. 28, 1985, 60-204494[U]

Int. Cl.[4] A44B *11/25*

U.S. Cl. 24—625 **11 Claims**

1. A buckle for fastening two end portions of an article, comprising:

(a) a male member adapted to be connected to one of the end portions of the article and including a pair of resiliently flexible legs having a pair of abutment surfaces; and

(b) a female member adapted to be connected to the other end portion of the article and including a socket portion couplable with said legs, said socket portion including

(1) a pair of opposed plates and a pair of spaced guide walls projecting from an inner surface of one of said plates toward the other plate and extending longitudinally of said plates so as to define therebetween a central slot for receiving therein said legs, and a pair of lateral grooves disposed on opposite sides of said slot, one of said plates having a pair of recessed portions facing said lateral grooves, respectively, said guide walls having a pair of retaining surfaces respectively engageable with said abutment surfaces of said legs to interlock said male and female members, and

(2) a pair of cantilevered resilient arms having at distal ends thereof a pair of actuating lugs extending toward each other and engageable with said legs to bring said abutment surfaces out of interlocking engagement with said retaining surfaces, said actuating lugs being disposed respectively in said lateral grooves and having a pair of stop fingers projecting therefrom into said recessed portions of said one plate.

4,672,726

MACHINE FOR REMOVING BURRS FROM SLABS

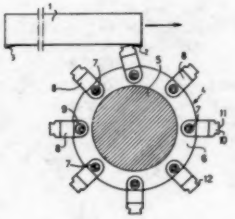
Gérard Delbecq, Grande Synthe; Jean-Pierre Markey, Hoymille-Bergues; Bernard Marcq, Dunkerque Malo Les Bains, and René Val, Grande-Synthe, all of France, assignors to Usinor Aciers, Puteaux, France

Filed Apr. 8, 1986, Ser. No. 849,466

Claims priority, application France, Apr. 12, 1985, 85 05553

Int. Cl.[4] B23P *17/00*; B23D *1/22*

U.S. Cl. 29—33 A **11 Claims**



1. A machine for removing burrs from an edge of a side of a slab or bloom which issues from a continuous casting plant and is cut to length by oxygen cutting, the slab having a head and a foot end, said machine comprising a frame, a rotor rotatively mounted in horizontal position on the frame and having a periphery and an axis of rotation, burr removing means carried on the periphery of the rotor, the burr removing means comprising self-retractable hammers each having a head which, upon rotation of the rotor, is capable of describing an envelope, the rotor being movable in vertical translation relative to the frame to a given position in which said envelope described by the heads is substantially tangent to said side of the slab, means carried by the frame for shifting the rotor in vertical translation to said given position, a driving shaft drivingly connected to the rotor, means for detecting the passage of the head end and foot end of the slab through the machine, and a control device connected to the driving shaft for causing the shaft to rotate in selected ones of two directions of rotation as a function of the detection of the passage of the head end or foot end of the slab by said detecting means.

4,672,727

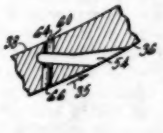
METHOD OF FABRICATING FILM COOLING SLOT IN A HOLLOW AIRFOIL

Robert E. Field, Tequesta, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 23, 1985, Ser. No. 812,098

Int. Cl.[4] B21K *3/04*; B23P *15/02*

U.S. Cl. 29—156.8 B **5 Claims**



1. In the fabrication of a hollow, longitudinally extending airfoil including a wall having an outer surface defining the external shape of the airfoil and having an inner surface defining at least a portion of a coolant compartment within said airfoil, the steps of:

forming a slot within said wall, the slot having a base within said wall and comprising a pair of spaced apart, facing side surfaces extending from the base to the outer surface to form a longitudinally extending slot outlet at the outer surface;

machining, from the outer surface of the wall toward the inner surface of the wall, at least one passage through the wall intersecting both slot side surfaces and intersecting the inner surface of the wall at the coolant compartment to form the inlet of a metering passage for carrying a metered amount of coolant fluid from the coolant compartment into the slot; and

blocking the passage between the outer surface of the airfoil and the slot to prevent the escape of coolant fluid from the slot through the passage.

4,672,728

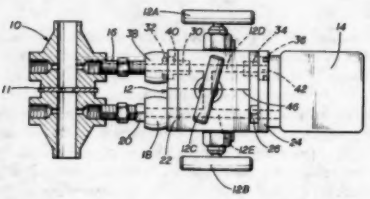
PRESSURE SIGNAL INSTRUMENTATION HAVING REMOVABLE FLANGES AND MOUNTING METHOD THEREFOR

Spencer M. Nimberger, Houston, Tex., assignor to General Screw Products Company, Houston, Tex.

Continuation-in-part of Ser. No. 666,668, Oct. 31, 1984, Pat. No. 4,582,089. This application Feb. 26, 1986, Ser. No. 832,872

Int. Cl.[4] B21D *53/00*; **F16L** *23/00*

U.S. Cl. 29—157 R **20 Claims**



1. In apparatus for interconnecting an orifice fitting to a pressure detector, said orifice fitting including a pair of pressure transmitting ports each at least partially defined by a tapered thread sidewall, a valve manifold for transmitting signals to said pressure detector, said valve manifold including a manifold body having first and second passageway interconnecting respective first and second inlet ports and first and second outlet ports, each of said inlet and outlet ports at least partially defined by a tapered thread sidewall, the improvement comprising:

a first flange for selective removable engagement with a planar surface of said orifice fitting and having first and second nipple receiving apertures;

first and second nipples for independently structurally interconnecting said first flange to said orifice fitting;

a second flange for selective removable engagement with an input end of said manifold body and having third and fourth nipple receiving apertures;

third and fourth nipples for independently structurally interconnecting said second flange to said manifold body;

each of said first, second, third and fourth nipples including a central passageway for transmitting fluid pressure from said orifice fitting to said valve manifold, said passageway at least partially defined by torque engaging surfaces for facilitating rotation of said nipple, a threaded end including a tapered thread for sealing engagement with said tapered thread sidewall of one of said orifice fitting or manifold body ports, a stop portion for forcing and retaining said first or second flange into rigid engagement with said orifice fitting or manifold, respectively, and axial spacing between said stop portion and said tapered thread being selected so that said nipple forces said flange into rigid engagement with said orifice fitting or manifold body when said tapered thread is in sealing engagement with said tapered thread sidewall of one of said ports; and

structural interconnection means for removably interconnecting said first and second flanges.

10. Apparatus for interconnecting an orifice flange assembly having an external curvilinear surface adjacent at least one of its pressure signal transmitting ports to a valve manifold including a manifold body having first and second passageway interconnecting respective first and second inlet ports and first and second outlet ports, each of said orifice flange signal transmitting ports, said inlet ports and said outlet ports at least partially defined by a tapered thread sidewall, the apparatus comprising:

first and second bodies each having a threaded first end including a tapered thread for sealing engagement with one of said orifice flange signal transmitting ports;

said first and second bodies each having a fluid passageway through said body and an output port adjacent a substantially planar exterior surface, said exterior surfaces of said first and second bodies lying within a substantially single plane;

a flange for selective removable engagement with a input end of said manifold body and having first and second nipple receiving apertures;

a pair of nipples for independently structurally interconnecting said flange to said manifold body, each of said nipples including a central passageway for transmitting fluid pressure from said orifice fitting to said valve manifold, said passageway at least partially defined by torque engaging surfaces for facilitating rotation of said nipple, a threaded end included a tapered thread for sealing engagement with said tapered thread sidewall of one of said manifold body inlet ports, a stop portion for forcing and retaining said flange into rigid engagement with said manifold body, and axial spacing between said stop portion and said tapered thread being selected so that said nipple forces said flange into rigid engagement with said manifold body when said tapered thread is in sealing engagement with said tapered thread sidewall of one of said inlet ports; and

interconnection means for removably interconnecting said flange to said first and second bodies.

16. A method of securing a flangeless valve manifold to an orifice fitting having threaded fluid pressure transmission ports, said valve manifold including a manifold body having first and second passageways interconnecting first and second threaded inlet ports and first and second threaded outlet ports, the method comprising:

forming a plurality of nipples each having a central fluid passageway, a tapered thread on an end for sealing engagement with one of said ports, and a stop portion at a selected spacing relative to said tapered thread;

structurally interconnecting a first flange to said orifice fitting by threading first and second of said plurality of nipples to said orifice fitting ports until said stop portion forces that first flange into rigid engagement with said orifice fitting;

structurally interconnecting a second flange to an input end of said manifold body by threading third and fourth of said plurality of nipples to said manifold body inlet ports until said stop portion forces said second flange into rigid engagement with said manifold body; and

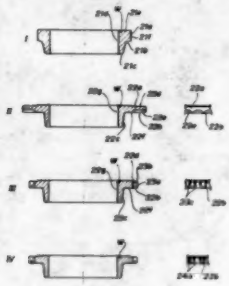
rigidly interconnecting said first flange to said second flange.

4,672,729

METHOD FOR MACHINING CLUTCH GEAR FOR AUTOMOBILE TRANSMISSION

Tetsuya Hoguchi, and Shigeru Morita, both of Toyota, Japan, assignors to O-Oka Forge Co. Ltd, Aichi, Japan

Filed Oct. 11, 1984, Ser. No. 659,910
Claims priority, application Japan, Oct. 20, 1983, 58-196638
Int. Cl.[4] B23P *15/14*
U.S. Cl. 29—159.2 1 Claim



1. A method for machining a clutch gear for an automobile transmission, consisting essentially of the steps of:

(a) providing a generally round annular bar of malleable material having an outwardly extending flange at one end thereof;

(b) pressing the generally round annular bar is a first die having a cross sectional mold portion of a predetermined dimension and including a plurality of radial grooves of triangular cross section to simultaneously provide the bar with a predetermined cross section, radially elongate the flange and provide the flange with radial chamfer projections thereon;

(c) fine blanking the chamfer projections on the flange of the bar with a second die including a tooth form mold having a predetermined dimension to form the chamfer projections into a corresponding clutch tooth form without forming a push wall extending radially outwardly from the clutch tooth form; and

(d) pressing the resultant clutch tooth form in a third die having a tapered surface mold portion adjacent the clutch tooth form to provide an inverted tapered surface on the clutch tooth form which prevents accidental disengagement of the clutch tooth form in an automobile transmission.

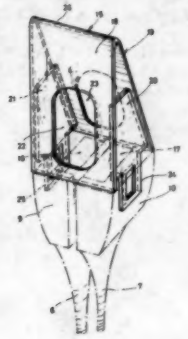
4,672,730

MOUNTING AID AND METHOD FOR ASSEMBLING A REAR BENCH SEAT OF A MOTOR VEHICLE

Ralf-Henning Schrom, Rüsselsheim, and Walter P. Truiter, Wiesbaden, both of Fed. Rep. of Germany, assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 7, 1986, Ser. No. 882,790
Claims priority, application Fed. Rep. of Germany, Sep. 27, 1985, 3534432
Int. Cl.[4] B23P *19/04*; B60R *22/00*
U.S. Cl. 29—241 8 Claims

1. Mounting aid for facilitating the passing through of belt buckles through slits in a rear seat of a motor vehicle, characterized in that it consists of a wedge tapering toward the seat, wherein the thicker end of the said wedge has a tongue for



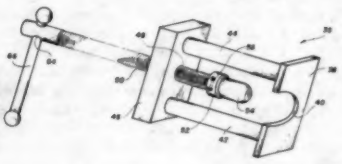
engaging in a belt buckle, which said tongue corresponds to an ordinary belt tongue.

4,672,731

FERRULE EXTRACTOR

Richard H. Taylor, 12672 Barrett La., Santa Ana, Calif. 92705

Filed Oct. 20, 1986, Ser. No. 920,460
Int. Cl.[4] B23P *19/04*
U.S. Cl. 29—259 4 Claims



1. A ferrule extractor for removing a ferrule from a pipe comprising:

a frame, said frame having a base and a plate;

support means fixedly secured to said plate and said base locating said base spaced from said plate;

seat means mounted on said base, said seat means adapted to connect with the ferrule for fixedly positioning the ferrule against said base;

a rod mounted on said plate, said rod being movable relative to said plate, said rod having an inner end and an outer end, said inner end located interiorly of said base between said base and said plate, said outer end being spaced exteriorly of said base;

a plug mounted on said inner end of said rod, said plug adapted to press against the pipe, by moving of said rod the ferrule is caused to be removed from the pipe;

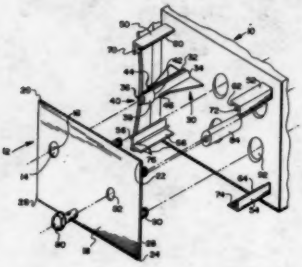
said plug having a body section, said body section having a cross-sectional configuration matching the inner diameter of the pipe with the cross-sectional configuration of said body section being slightly larger than the inside diameter of the pipe but smaller than the outer diameter of the pipe; and

said plug having a substantially enclosed chamber, one end of said rod being located within said chamber and assuming a loose fit within said chamber, said plug being rotatably mounted on said rod, said plug being capable of being tilted a limited amount relative to said rod due to said loose fit between said rod and said chamber.

4,672,732
METHOD OF FIXEDLY ATTACHING A COMPONENT TO A BASE MEMBER

Robert J. Ramspacher, Indianapolis, and Charles Butcher, Carmel, both of Ind., assignors to RCA Corporation, Princeton, N.J.

Filed Feb. 27, 1986, Ser. No. 833,927
Int. Cl.[4] B21D *39/03*; B23P *11/00*
U.S. Cl. 29—429 **2 Claims**



1. A method for fixedly attaching a component to a base member of a cabinet comprising:

providing said component with an aperture;

providing said base member with a resiliently collapsible holding member and fixed component aligning means; said collapsible holding member defining from a free end thereof first and second cross-sections which are respectively greater than and smaller than the cross-section of said aperture in said component;

inserting said apertured component against said aligning means and over said free end of said collapsible holding member at a first work station to cause said holding member to contract to allow its passage through said aperture in said component and then to expand for temporarily aligning and securing said component to said base member to prevent said component from dislocating during handling operations prior to its final attachment to said base member;

transporting said base member with said temporarily secured and aligned component to a second work station; and

fixedly attaching with a separate fastener said temporarily secured and aligned component to said base member at said second work station.

4,672,733
METHOD OF MAKING A SHAFT SEAL RING

Wilhelm Schmitt, Heppenheim, Fed. Rep. of Germany, assignor to Firma Carl Feudenberg, Weinheim, Fed. Rep. of Germany

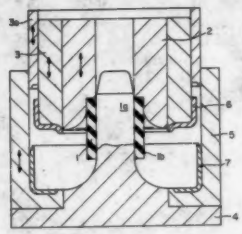
Continuation of Ser. No. 531,221, Sep. 9, 1983, abandoned. This application May 28, 1985, Ser. No. 738,682
Claims priority, application Fed. Rep. of Germany, Dec. 14, 1982, 3246152
Int. Cl.[4] F16J *15/00*; B29C *65/56*
U.S. Cl. 29—511 **12 Claims**

1. A method of making a shaft seal ring comprising:

providing a hollow-cylinder, hose-like tube having a leading end, said tube being of an elastic material and said tube having a wall thickness and an axial length, said axial length being greater than the tube wall thickness;

providing a form having an end portion receiving the tube which is substantially cylindrical and of constant diameter and a trumpet-shaped, continuously-increasing diameter portion curving outwardly on a non-interrupted smooth arc;

slipping the tube along the form to cause a flow of the elastic material of the leading end of the tube in one direction until the leading end of the tube forms a flexible flange generally radially extending from the tube, the flange having a wall thickness less than that of the tube; and

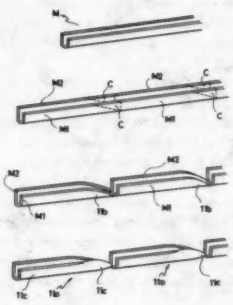


securing and mechanically stabilizing the radially extending flange between an inner ring and a reinforcing ring to form a shaft seal ring having a shaft gripping section and a flexible outwardly extending area gripping zone.

4,672,734
SUTURE NEEDLE AND ITS MANUFACTURING PROCESSES

Tsutomu Kawada, Chuo, and Yasuo Nakamura, c/o Nakamura Co., Ltd., 3-3, Nihonbashi Honcho, Chuo-ku, both of Japan, assignors to Yasuo Nakamura, Tokyo, Japan

Filed Feb. 19, 1986, Ser. No. 830,926
Int. Cl.[4] B21D *39/00*; B23D *17/00*; A61B *17/06*; B21G *1/00*
U.S. Cl. 29—517 **2 Claims**



1. A process for manufacturing a suture needle, comprising:

(a) applying compression for a U-shaped extended metal plate to increase its resilience;

(b) forming a nearly triangular cutaway portion recessed on both walls of said U-shaped metal plate so as to produce a front part of individual needle pattern;

(c) forming a pointed end of said individual needle pattern by closing both walls of said front part;

(d) dividing a series of needle patterns combined with each other at respective pointed ends into a plurality of segmented needle bodies;

(e) grinding individual needle bodies;

(f) inserting a suture in a hollow portion of said needle body of a U-shaped section, closing said both walls of said U-shaped needle body and inserting and fixing in said hollow portion, thereby producing a suture needle;

(g) forming said suture needle in a bended form; and

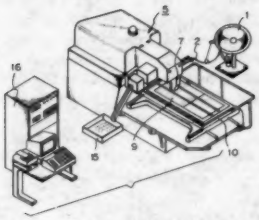
(h) providing said suture needle with a sterilization treatment.

4,672,735

CONNECTOR PIN INSERTER

Michio Tamano, Oyama, and Yoshiaki Kawasaki, Hasuda, both of Japan, assignors to Fujitsu Limited, Kanagawa, Japan

Filed Dec. 27, 1985, Ser. No. 813,945
Claims priority, application Japan, Dec. 28, 1984, 59-274530
Int. Cl.[4] B23P 19/00; H05K 3/00
U.S. Cl. 29—564.6 20 Claims



1. A connector pin inserter for feeding continuous connector pins formed integrally in a comb-like form as a belt-like carrier, separating the connector pins from the carrier and pressing the connector pins into through holes of a printed circuit board, said connector pin inserter comprising a board detector for detecting the kind of printed circuit board, means for reading detection results from the board detector, applying moving conditions to an X-Y table, disposed below a press-inserting mechanism for the connector pin to set the position of the printed circuit board, and further applying press-inserting conditions to a press-inserting mechanism for performing a series of operations of press-inserting pins, based on data of the board thickness, press-inserting position, pin size and insertion pitch selected according to the kind of printed circuit board detected, and a plurality of cam link mechanisms arranged on a same cam axis, wherein said connector pin inserter further comprises the following means driven by each cam link mechanism: (a) cutting means for separating a predetermined number of connector pins held by a clamping mechanism, (b) push-out means for pushing out the clamping mechanism holding the separated connector pins thereon from an inserter head and pressing the connector pins into through holes of the printed circuit board, (c) rotating means for rotating the inserter head around an axis parallel to the feed direction of the carrier, and (d) feed means for intermittently feeding the carrier, and wherein the series of operations for cutting and separating the continuous connector pins and inserting the separated connector pins into through holes of the printed circuit board are sequentially controlled.

4,672,736

METHOD FOR PRODUCING LASER DIODES WITH AN ADJUSTED AND INTEGRATED HEAT SINK

Heinz Westermeier, Neubiberg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 19, 1985, Ser. No. 766,540
Claims priority, application Fed. Rep. of Germany, Sep. 26, 1984, 3435306
Int. Cl.[4] H01L 21/302, 21/461; B01J 17/00
U.S. Cl. 29—569 L 9 Claims

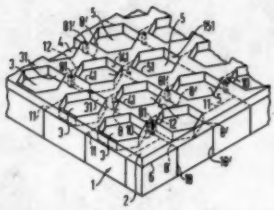
1. 1 A method for manufacturing a plurality of laser diodes, each of which has an integrated heat sink wherein each heat sink comprises a body of material having good thermal conductivity applied to a semiconductor body of the laser diode close to a laser-active zone, each individual laser diode having resonator mirrors, comprising the steps of:

providing a semiconductor wafer having laser functions necessary for the single laser diodes;

covering a surface of the semiconductor wafer with a masking layer;

providing openings in the masking layer which extend down to the surface of the wafer, the openings having opposite parallel end faces and being arranged in parallel rows, and adjacent rows being offset relative to one another by an amount equal to approximately half of a dimension of an individual hole in a direction along the row so that openings in adjacent rows are offset relative to one another;

filling the openings with thermally conductive material for the heat sink;



scoring a surface of the wafer parallel to and near the end faces to provide fracture lines between adjacent rows;

breaking the wafer into individual ignots along the fracture lines so as to form fracture surfaces at which said mirror faces of said individual diodes are thus provided; and

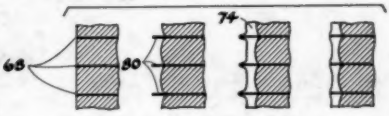
breaking the individual ingots along previously applied scoring lines between individual laser diodes in each of the ingots to provide the indivdual laser diodes, each of which have an integrated heat sink.

4,672,737

DETECTOR ARRAY MODULE FABRICATION PROCESS

John C. Carson, Corona Del Mar, and Stewart A. Clark, Irvine, both of Calif., assignors to Irvine Sensors Corporation, Costa Mesa, Calif.

Division of Ser. No. 572,802, Jan. 23, 1984, Pat. No. 4,551,629, which is a continuation of Ser. No. 187,787, Sep. 16, 1980, abandoned. This application Aug. 2, 1985, Ser. No. 761,889
Int. Cl.[4] H01L 31/18
U.S. Cl. 29—572 15 Claims



1. A method for fabricating a photo-detector array module comprising:

providing a number of equal-sized semiconductor chips, each having integrated circuitry thereon, and each having a multiplicity of closely spaced electrical contact points at one end thereof;

stacking and bonding the semiconductor chips to form a rectangular parallelepiped structure with the electrical contact points in an array of closely spaced points on the focal plane end of the stacked chips;

etching the focal plane ends of the stacked chips to remove a small amount of the body material of the chips while leaving the contact points protruding;

depositing insulation material to cover the etched focal plane ends of the stacked chips;

removing sufficient material from the insulation-covered ends of the stacked chips to uncover the electrical contact points; and

placing a multiplicity of photo-detectors on the insulation-

covered ends of the stacked chips in such a way that each photo-detector is in electrical contact with a single electrical contact point, while being otherwise insulated from the body material of the semiconductor chips.

4,672,738

METHOD FOR THE MANUFACTURE OF A PN JUNCTION WITH HIGH BREAKDOWN VOLTAGE

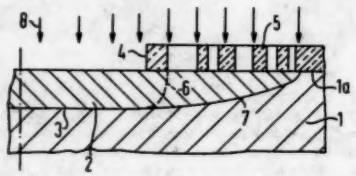
Reinhard Stengl, Munich; Ulrich Goesele, Hoehenkirchen, and Christine Fellinger, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 13, 1985, Ser. No. 776,161

Claims priority, application Fed. Rep. of Germany, Sep. 28, 1984, 3435830

Int. Cl.[4] H01L *29/74, 21/265*

U.S. Cl. 29—576 B **10 Claims**



1. A method for the manufacture of a pn junction having a high breakdown voltage at the boundary surface of a doped semiconductor body which comprises:

providing a mask having a relatively large opening for passing a dopant therethrough, said mask having a marginal edge extending laterally beyond the edge of said relatively large opening,

said mask having smaller, auxiliary openings in said marginal edge, said openings being sized and spaced such that lesser amounts of dopant pass through said openings as the distance of said auxiliary openings from the edge of said relatively larger opening increases, and

ion implanting a dopant through said mask into said semiconductor to thereby form discrete diffusion sources defined by said auxiliary openings to generate a doping profile which gradually approaches the boundary surface as the distance from the edge of the relatively large opening increases.

4,672,739

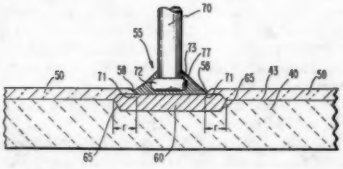
METHOD FOR USE IN BRAZING AN INTERCONNECT PIN TO A METALLIZATION PATTERN SITUATED ON A BRITTLE DIELECTRIC SUBSTRATE

Robert W. Churchwell, Highland; Philip L. Flaitz, Hopewell Junction, and James N. Humenik, LaGrangeville, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 11, 1985, Ser. No. 721,885

Int. Cl.[4] H01L *21/88*

U.S. Cl. 29—589 **10 Claims**



1. In a method for brazing interconnect pins to metallic pads, each pad situated within a pattern of conductive metallurgy formed on a surface of a dielectric substrate, the improvement comprising the steps of:

forming a dielectric layer on the surface of said substrate, said dielectric layer having a lower coefficient of thermal expansion than that of said substrate and comprising a plurality of openings, wherein each of said openings is concentrically aligned with a corresponding pad and is smaller than the corresponding pad so as to overlap a closed peripheral portion thereof and thereby define a closed wall to contain brazing material such that brazing material is prevented from contacting an edge of the corresponding pad in order to reduce the stress occurring at an interface between the pad and the substrate;

seating a head of an interconnect pin in a corresponding one of said openings; and

bonding the head of said pin to said pad by the brazing material contained within said closed wall.

4,672,740

BEAM ANNEALED SILICIDE FILM ON SEMICONDUCTOR SUBSTRATE

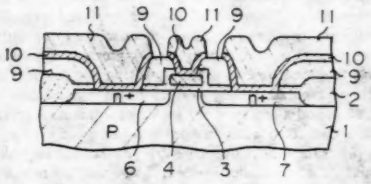
Kazunari Shirai, Yokohama; Hajime Kamioka, Mizusawa, and Shigeyoshi Koike, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Aug. 28, 1984, Ser. No. 644,962

Claims priority, application Japan, Aug. 31, 1983, 58-159536

Int. Cl.[4] H01L *21/44, 21/441*

U.S. Cl. 29—590 **24 Claims**



23. A process for fabricating a semiconductor device having a contact window through an insulating layer to a doped region of dopants in a semiconductor substrate, comprising the steps of:

(a) depositing a film of a refractory metal and silicon on the insulating layer and through the contact window to contact the doped region of the semiconductor substrate; and

(b) annealing the film using beam annealing for a period of time sufficient to ensure silicidation of the film and to stabilize the contact of the film with the doped region of the semiconductor substrate while avoiding substantial rediffusion of the dopants in the doped region.

4,672,741

END EFFECTOR APPARATUS FOR POSITIONING A STEAM GENERATOR HEAT EXCHANGER TUBE PLUGGING TOOL

Paolo R. Zafred, Pittsburgh; Luciano Veronesi, O'Hara Township, Allegheny, and Robert J. Maurer, Monroeville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 27, 1985, Ser. No. 749,603

Int. Cl.[4] B23P *15/26, 19/00*

U.S. Cl. 29—726 **29 Claims**

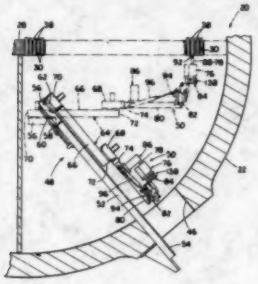
1. An apparatus for moving and positioning a tool for obtaining and using secondary workpieces to perform operations on a primary workpiece, said apparatus comprising:

(a) a base;

(b) a guidance mechanism having said tool smounted

thereon and being operable to align and position said tool for effecting an operation by said tool wherein one of said secondary workpieces is applied on said primary workpiece and for effecting loading of another of said secondary workpieces on said tool after each operation thereof;

(c) a positioning mechanism movably supported on said base and having said guidance mechanism mounted thereon, said positioning mechanism being operable to move said



guidance mechanism and said tool therewith between respective tool operating and secondary workpiece loading positions and

(d) a magazine supported on said base and containing a plurality of said secondary workpieces for loading on said tool when said tool is moved with said guidance mechanism to said loading position by said positioning mechanism.

4,672,742

PROCESS FOR ASSEMBLING AND CONNECTING INTEGRATED CIRCUITS TO CIRCUIT UNITS AND APPARATUS FOR CARRYING OUT THE PROCESS

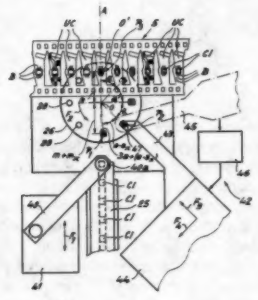
Alain Juan, Chézard, Switzerland, assignor to ETA SA Fabriques d'Ebauches, Granges, Switzerland

Filed Oct. 16, 1985, Ser. No. 787,895

Claims priority, application France, Oct. 30, 1984, 84 16748

Int. Cl.[4] H05K *3/34;* B23P *19/00*

U.S. Cl. 29—840 **6 Claims**



1. Process for assembling integrated circuits with circuit units longitudinally arranged in a row along a ribbon by thermo compression welding or brazing of the integrated circuit studs to the terminals of the respective circuit units on the ribbon in which

the ribbon is caused to advance step by step through a welding post in which the assembly takes place following precise alignment of each integrated circuit with a circuit unit on the ribbon;

simultaneously effecting on separate integrated circuits at least a loading operation, an aligning operation and a welding operation by means of an integrated circuit support platform rotatively mounted in the welding post and angularly displaceable step by step;

placing integrated circuits on the support platform in the correct welding position determined by a system of polar coordinates defined with respect to the platform wherein the integrated circuits are situated on the polar axis of said system at a radius m with each step of the platform equal to a phase angle displacement a in said system;

loading said integrated circuits by depositing each one thereof on said platform at a location the coordinates of which are slightly different from a whole number of phase angles a and/or from said radius m;

aligning said integrated circuits by sliding thereof effected in a plane parallel to the platform surface to a position exactly displaced relative to the welding post by a whole number of phase angles a and relative to the platform center by a distance corresponding to the radius m.

4. Apparatus for assembling and connecting integrated circuits to circuit units comprising a post for welding by thermo compression or brazing, means for effecting stepping advance of a ribbon bearing said circuit units in said welding post, loading means enabling introduction one by one of the integrated circuits in the welding post normal to the respective circuit units and alignment means acting prior to each welding operation to bring the integrated circuit studs into alignment with the connection terminals of a circuit unit wherein there is provided a platform rotatively mounted on an axis vertically arranged relative to the welding post, means for driving the platform in a stepwise manner in synchronism with the ribbon movement, said platform comprising at least three locations corresponding to as many work positions angularly separated on a same circumference and passing successively normal to the welding tool during movement of the platform, said positions being respectively and simultaneously served between successive steps of the platform by said loading means, said aligning means and said welding tool, said loading means comprising a transfer arm arranged and adapted to load each integrated circuit onto the platform at the corresponding position with an angular and radial separation relative to the position which the circuit is to occupy when such position stops under the welding tool, and said alignment means comprising a pushing arm displaceable in a plane parallel to the surface of the platform so as to nullify said angular and radial separation of the integrated circuit by sliding thereof to the correct position whereby the circuit is correctly introduced under the welding tool.

4,672,743

FOLDING HAND KNIFE

Robert D. Grahm, 10115 Bridlevale Dr., Los Angeles, Calif. 90064

Filed Sep. 15, 1986, Ser. No. 906,987

Int. Cl.[4] B26B *29/02*

U.S. Cl. 30—153 **6 Claims**

1. A folding tool assembly comprising:

a. a tool element having a working end and a pivotal end;

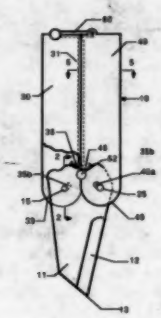
b. a first elongate handle piece having a first upper and lower end and generally formed in the manner of a folded-over sheet structure including one longitudinal fold edge extending between said first upper and lower ends joining two opposed first planar surfaces separated by a gap, each first surface including a first semicircular edge proximate said first lower end;

c. a second elongate handle piece having a second upper and lower end and generally formed in the manner of a folded-over sheet structure including one longitudinal fold edge extending between said second upper and lower ends joining two opposed second planar surfaces separated by

a gap, each said second surface including a second semicircular edge proximate said second lower end;

d. a first and second pivot pin extending orthogonally across said tool element laterally spaced relative each other in said working end of said tool element;

e. a first and second inclined slot formed in said first and second inclined surfaces each aligned from a point substantially central to said first and second circular edges towards the corresponding one of said fold edges, said first and second handle pieces receiving said tool element in said gaps thereof for receiving said first and second pivot pin in the corresponding one of said first and second slots;



f. a cam edge formed on the exterior of said pivotal end including a first cam edge segment proximate said first pivot pin substantially defined by a first radius relative thereto and a second cam edge segment proximate said second pivot pin substantially defined by a second radius relative thereto said first radius having a dimension greater than said second radius; and

g. a first and second spring means respectively extending from said fold edges of said first and second handle pieces proximate the lower ends thereof and deployed or urging contact against the respective ones of said first and second cam edge segments.

4,672,744

ROTARY TRIMMER

Richard L. Jackson, 7193 N. Preble County Line Rd., Lewisburg, Ohio 45338, and Ansel N. John, 74 Benzell Dr., Centerville, Ohio 45459

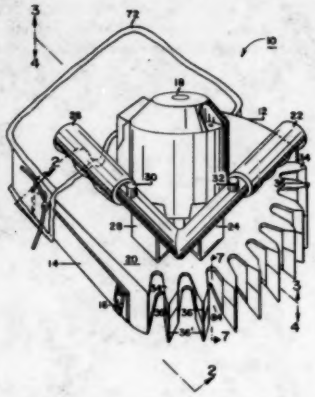
Filed Feb. 15, 1985, Ser. No. 702,400
Int. Cl.[4] B26B 7/00
U.S. Cl. 30—276 **4 Claims**

1. In a rotatable device for cutting vegetation and the like, comprising:

a rotatable blade housing member,

a blade member mounted to said rotatable blade housing member in a plane generally parallel to a plane described by said rotatable blade housing member, said blade member having a plurality of cutting blade elements, wherein at least one of said cutting blade elements cutting in a plane essentially parallel to the plane described by said rotatable blade housing member and at least one cutting blade element cutting in a plane essentially perpendicular to the plane described by said rotatable housing member, said blade member further including an air impeller directing air in a direction described by said rotatable blade housing member,

a guard member generally encapsulating said rotatable blade housing member and said blade member, said guard member having a plurality of openings at predetermined locations peripherally about said cutting blade elements, said guard member being provided with a plurality of forwardly radially extending projections for separating vegetation prior to said vegetation coming in contact with said cutting blade elements, said guard member being further provided with handle means and means for rotating said rotatable blade housing member, and



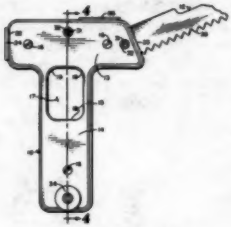
a vegetation material collection member mounted on and made a part of said guard member, said airflow directing cut vegetation material to said collection member.

4,672,745

SPORTSMAN'S TOOL HANDLE

Arnold J. Wilkens, 12185 Sherwood Ct., Hayden Lake, Id. 83835

Filed Apr. 8, 1985, Ser. No. 720,855
Int. Cl.[4] B25G 1/00
U.S. Cl. 30—340 **2 Claims**



1. A "T" shaped handle element for a plurality of releasably engagable tools, comprising, in combination;

a rigid shorter arm of trapezoidal peripheral and rectilinear cross-sectional shape with rounded corners and edges having one angled end and structurally communicating in its medial portion with with a longer arm of cross sectional shape, said longer arm defining a finger hole with rounded edges and corners in its medial portion immediately inwardly adjacent its communication with the shorter arm, said handle being formed by two peripherally similar halves releasably joined at adjacent medial planar surfaces and maintained in structural communication by at lease one mechanical fastener communicating therebetween;

at least one floatation chamber defined within the handle element to lessen the composite density thereof to cause the handle to float in water;

plural similar tool fastening structures defined about the

periphery of the handle to accept similar shanks of a plurality of tools, said tool fastening structures comprising

a fastening chamber of the same peripheral configuration as the fastening shank of a tool to be therein contained,

a fastening pin extending part way into the fastening chamber to allow passage of a tool shank thereover and to receive the hole of a shank thereabout, and

a fastening screw threadedly engaged in the handle element in a position to extend into the associated fastening chamber and extending in the opposite direction from the fastening pin through the handle element to allow releasable fastening of the fastening shank of a tool in the fastening chamber;

a sharpening stone carried by the end of the shorter arm opposite its angled end, said stone extending a spaced distance from the handle element; and

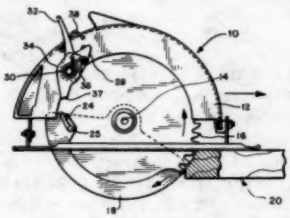
a flintstone carried by the periphery of the handle element and extending a spaced distance therefrom.

4,672,746

PROTECTIVE MECHANISM FOR CIRCULAR SAWS

Christopher Zeilenga, P.O. Box 265, South Holland, Ill. 60473-0265

Filed May 8, 1986, Ser. No. 861,063
Int. Cl.[4] B27G *19/04*
U.S. Cl. 30—391 **10 Claims**



1. A protective mechanism on a circular saw, the saw having a stationary section and a blade guard section rotatable about a circular saw blade, such protective mechanism comprising a latching means attached to said stationary section of the saw, said latching means having an unlatched position established by the operator, and a latched position, an activating means connected to the rotatable blade guard section, such that during the cutting process, as the rotatable guard opens, said activating means comes into contact with said latching means, said activating means causing said latching means to move from its unlatched position to its latched position, said latching means in its latched position thereby preventing motion of said rotatable blade guard after it has reclosed, such that at the end of the cutting process manual unlatching is required to restart the cutting process.

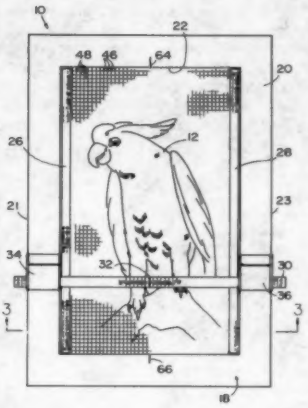
4,672,747

MAGNETIC DEVICE FOR AIDING SCALED REPRODUCTION OF PICTORIAL IMAGES IN NEEDLEWORK

Eleanor Turner, 4348 Palo Verde, Lakewood, Calif. 90713

Filed Dec. 9, 1985, Ser. No. 806,486
Int. Cl.[4] G01B *3/00*
U.S. Cl. 33—1 K **14 Claims**

1. In a device for facilitating the reproduction of a pictorial image in needlework the improvement comprising: a flat, magnetic sheet forming a backing for an image to be reproduced, a flat, magnetic frame including a border which defines a central, rectangular window therewithin, magnet means for magnetically holding said frame on said backing, a plurality of sets of vertical and horizontal scales in which the graduations on said scales in each set are spaced uniformly apart and are at a desired scale of reproduction of said image in a needlework piece in which said image is to be reproduced in needlework and the graduations on scales in different sets are spaced apart different distances to correspond to different desired sacles of reproduction, wherein said graduations of said vertical scales correspond to weft strands in said needlework piece and said graduations on said horizontal scales correspond to warp strands in said needlework piece and said horizontal scales are moveable along said vertical scales whereby the longitudinal position of said horizontal scales relative to said vertical scales marks a weft strand to be knitted and said vertical scales are



adapted for mounting at a side of said window, and said horizontal scales each have a center marker and mirror image sets of graduations ascending in both directions from said center marker, and said scales include numeric indicia on both said vertical and horizontal scales and said indicia on said vertical scales increase from one and to another to identify corresponding weft strands in said workpiece and said indicia on said horizontal scales are duplicate number sequences ascending in opposite directions from said center marker and said numeric indicia correspond to coordinate positions in terms of weft and warp strands in said needlework piece.

4,672,748

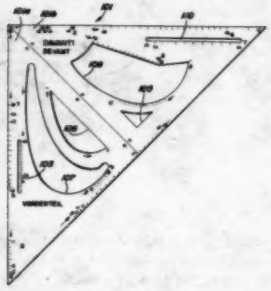
PAIR OF TAILORING SET-SQUARES FOR SKETCHING THE COMPONENT PARTS OF CLOTHING ESPECIALLY FOR CONSTRUCTING GARMENTS OF ANY SIZE OR MODEL

Guiseppe Perazzolo, Via Francesco Orsoni 54, Bologna, Italy

Continuation of Ser. No. 568,501, Jan. 5, 1986, abandoned, which is a continuation of Ser. No. 400,051, Jul. 20, 1982, abandoned. This application Mar. 5, 1986, Ser. No. 837,651
Claims priority, application Italy, Jul. 20, 1981, 4949/81[U]
Int. Cl.[4] A41H *3/00*
U.S. Cl. 33—11 **2 Claims**

1. A tailoring instrument for sketching the component parts of garments based upon body measurements, said instrument comprising: a triangular instrument in the form of an isosceles right triangle defined by a pair of equally sized right isosceles triangles hingedly connected along respective shorter legs thereof, each of said shorter legs defined by the altitude of said instrument, said instrument having first and second linear perpendicular legs of equal length and a third linear leg extending between and interconnecting outer ends of each of said first and second legs, each of said legs carrying scale indicia corresponding to body measurements on both sides thereof and positioned along outer edges thereof, said first leg including a first scale on first and second sides thereof and extending along the outer edge thereof having scale indicia corresponding with

sleeve length and a second scale on said first and second sides thereof and extending along said outer edge thereof having scale indicia corresponding with waistline length, said second leg including a first scale on first and second sides thereof and extending along the outer edge thereof having scale indicia corresponding with neck position and a second scale on said first and second sides thereof and extending along said outer edge having scale indicia corresponding with bustline height, said third leg including a waistline measurement scale on one side and extending along an outer edge thereof having scale indicia corresponding with a first fraction of waistline length, said third leg including a waistline measurement scale on a second side thereof and extending along substantially one-half of the outer edge of said third leg and having scale indicia corresponding with a second fraction of waistline length different from said first fraction, said instrument including a plurality of interiorly positioned openings disposed on opposite sides of the altitude of said triangle and spaced therefrom, said interior openings bearing scale indicia along their edges, one of said



interior openings including a linear edge disposed obliquely relative to each of said legs of said instrument, said linear edge having scale indicia positioned therealong on both sides of said instrument corresponding with shoulder width, said one interior opening including a curved edge having scale indicia positioned therealong on both sides of said instrument corresponding with neckline size, a second of said interior openings including a curved edge having scale indicia positioned therealong corresponding with sleeve length, and first and second elongated linear slots having scale indicia along an inner linear edge thereof on one side of said instrument, each of said linear slots having an inner linear edge and an outer linear edge disposed parallel to and inwardly of respective outer edges of said first and second legs, one of said slots having scale indicia corresponding with waistline girth positioned along said inner linear edge thereof and the other of said slots having scale indicia corresponding with sleeve length positioned along said inner linear edge thereof, and at least one of said scales along said slots having a non-uniform scale progression.

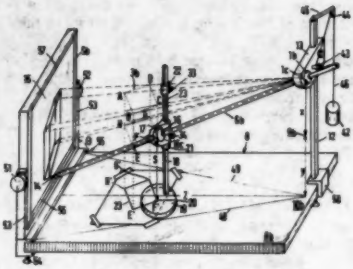
4,672,749

MECHANICAL PERSPECTIVE DRAFTING DEVICE

Vladimir F. Tamari, 1-27-11, Shimmachi, Setagaya-ku, Tokyo 154, Japan

Filed Jun. 17, 1985, Ser. No. 745,806
Claims priority, application Japan, Jun. 26, 1984, 59-131519
Int. Cl.[4] B43L *13/00*
U.S. Cl. 33—18.3 **5 Claims**

1. A mechanical perspective drafting device comprising a first drafting board, a second drafting board positioned on said first drafting board and forming an angle (θ) therewith; a training unit including a base, a vertical member on said base and extending upwardly therefrom, and a support member on said vertical member and adjustable vertically therealong; and a long member, said support member including a universal joint by which said long member is mounted and through which said long member can slide and rotate freely, said long member being fitted with a drawing device ending with a point which can come in contact with said second drafting board, the universal joint and the point defining a line which is passing through an imaginary three dimensional figure and this causes



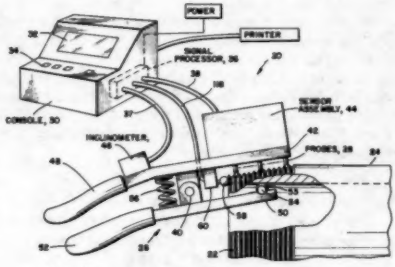
the point to draw a perspective projection of the figure as it is seen from the position of the universal joint, the movement of the line through the figure being assisted by said base that forms a tracing guide which guides said support member and thereby the long member and enables a manual tracing of a figure on said first board, and where a plurality of stops are present on said vertical member to limit movement of said support member vertically of said member.

4,672,750

THREAD MEASUREMENT TOOL

Anthony Storace, Norwalk, and Albert V. Yannella, Milford, both of Conn., assignors to AMF, Inc., N.J.

Continuation of Ser. No. 771,464, Aug. 29, 1985, abandoned, which is a continuation of Ser. No. 581,407, Feb. 17, 1984, abandoned. This application Jul. 31, 1986, Ser. No. 891,066
Int. Cl.[4] G01B *5/16, 5/24, 7/30, 19/28*
U.S. Cl. 33—199 R **39 Claims**



1. A thread-measuring tool comprising:

a sensor assembly;

means for affixing said sensor assembly contiguous to the thread of a pipe section;

inclinometer means disposed within said assembly for sensing a taper of the thread;

a first set of probes having at east one probe for the measurement of the height of the thread, at least one of the probes of said first set of probes being slideably mounted within said assembly for movement in a direction normal to the longitudinal axis of the pipe section and for translation in

a direction parallel to the axis of said pipe section, the axial translation permitting alignment of individual ones of the probes with corresponding troughs of the thread wherein maximum vertical movements can occur for measurement of the thread height;

a second set of probes for sensing the location of troughs of the thread, at least one of the probes of the second set being slideably mounted within said assembly in two directions one of which is normal to the axis of the pipe section and a second of which is parallel to the axis of the pipe section, there being means coupled to said probes of said second set for measuring displacement of individual ones of the probes in each of said two directions for obtaining the coordinates of the respective troughs in normal and axial components; and

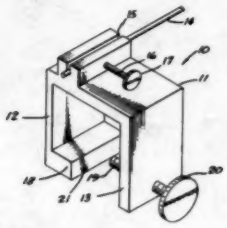
means for combining measurements of location in each of said coordinate directions to provide deviation in diameter of the pipe section and error in the lead length of the thread of the pipe section.

4,672,751

CHAIN ALIGNMENT TOOL

J. D. Jones, 1211 Kwis Ave., Hacienda Heights, Calif. 91745

Filed Jul. 23, 1986, Ser. No. 888,414
Int. Cl.[4] G01B 5/24
U.S. Cl. 33—286 **11 Claims**



1. A chain alignment tool to assist in the aligning of a chain sprocket with respect to its chain, said tool comprising:

a tool body having a longitudinal opening defined by two downwardly extending arms, the first of said two arms having an inwardly protruding sprocket-contacting extension and the second of said two arms having an extendable clamp held thereby, said extendable clamp including means for moving the same toward and away from said sprocket-contacting extension and said clamp being in horizontal alignment with said sprocket-contacting extension; and

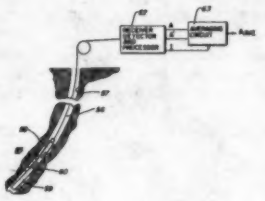
a pointer held by said tool body and extending outwardly therefrom in a direction parallel to the surface of said sprocket-contacting extension and directly above the longitudinal opening, whereby the extendable clamp may be opened and the tool body opening placed over a chain-supporting sprocket and the extendable clamp closed to hold the sprocket-contacting extension against the sprocket and to cause the pointer to extend parallel to the surface of the sprocket thereby indicating the proper line of direction of the chain.

4,672,752

METHOD OF DETERMINING THE DIFFERENCE IN BOREHOLE AZIMUTH AT SUCCESSIVE POINTS

Rand H. Hulsing, II, Redmond; Rex B. Peters, Woodinville, and Kurt E. Steinke, Bellevue, all of Wash., assignors to Sundstrand Data Control, Inc., Rockford, Ill.

Division of Ser. No. 576,024, Feb. 1, 1984, Pat. No. 4,614,040, which is a division of Ser. No. 406,431, Aug. 9, 1982, Pat. No. 4,434,654. This application Apr. 25, 1986, Ser. No. 856,395
Int. Cl.[4] G01C 19/00
U.S. Cl. 33—302 **2 Claims**



1. The method of determining the difference between the borehole azimuth angles at successive points along the borehole which comprises:

passing a probe with an inclinometer through the borehole;

measuring the inclination angle between the vertical component of earth's gravitational force and the borehole axis at each of said successive points;

measuring the angle between the vertical component of earth's gravitational force and a probe reference axis, transverse to the borehole axis, at each of said successive points; and

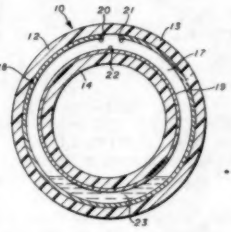
calculating the difference in borehole azimuth between successive points from the two angular measurements at one point and the two angular measurements at the next point.

4,672,753

ROTATION SENSOR

William H. Kent, and Robert C. Steel, both of Westford, Mass., assignors to Gas Research Institute, Chicago, Ill.

Filed May 19, 1986, Ser. No. 864,672
Int. Cl.[4] G01C 9/06
U.S. Cl. 33—366 **28 Claims**



1. An inclinometer or attitude sensor, adapted to be connected to a movable object to indicate and measure pitch and roll, comprising

a hollow toroidal body of non-porous, electrically-nonconductive material having an interior continuous open channel with distinct wall portions,

a resistor positioned on one wall of said open channel beginning at one point on said wall and extending along said wall and ending at a point spaced from said one point,

a collector comprising a conductor positioned on and extending completely around another wall of said open channel and spaced from said resistor,

a pair of electrical contacts on the ends of said resistor and extending outside said body,

an electrical contact connected to said collector and extending outside said body, and

a quantity of fluid, having both resistive and dielectric properties, positioned in said open channel and occupying a volume less than about a 30° sector of said channel.

4,672,754

SHOE SOLE

Johann Ehrlich, Krems, Austria, assignor to Patoflex Corporation, Cave Creek, Ariz.

Continuation of Ser. No. 642,186, Aug. 17, 1984, abandoned. This application Aug. 26, 1986, Ser. No. 902,049

Claims priority, application Austria, Aug. 18, 1983, 2962/83

Int. Cl.[4] A43B *1/08*

U.S. Cl. 36—85 **65 Claims**

1. A shoe sole comprising an upper sole portion and a lower sole portion which cooperate to substantially define front, intermediate and rear sections of said shoe sole construction, said upper sole portion consisting of a wood material and having top and bottom surfaces, the top surface of said upper sole portion defining the top surface of said shoe sole at least in the areas where it is contacted by the heel and by the ball of the foot of a wearer, said lower sole portion consisting of an elastic material and having upper and lower surfaces, the bottom surface of said upper sole portion being secured to the upper surface of said lower sole portion by a forming operation at least in the front and rear sections of said shoe sole, the thickness of said lower sole portion in the rear section of said shoe sole being at least 1.5 times the thickness of the lower sole portion in the front section of said shoe sole, the thickness of said lower sole portion in the area of the rear sole portion being at least one third of the thickness of said rear section of the sole, the main portion of the rear section of the lower surface of said lower sole portion being defined by a substantially planar downwardly facing surface, at least the portion of said lower sole portion which is located in the rear section of said shoe sole consisting of a relatively hard, durable, wear-resistant, elastic synthetic plastic material having a cellular structure.

4,672,755

UNLATCHING LEVER AND BOOT HAVING SUCH UNLATCHING LEVER

Louis Benoit, Frangy, and Bernard Nerrinck, La Balme-de-Sillingy, both of France, assignors to Salomon S.A., Annecy, France

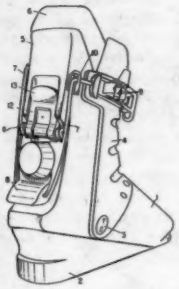
Filed May 20, 1985, Ser. No. 736,088

Claims priority, application France, May 18, 1984, 84 08599

Int. Cl.[4] A43B *5/04, 11/00*

U.S. Cl. 36—117 **52 Claims**

1. Latching apparatus and unlatching means for use with a ski boot on a ski slope, said ski boot comprising a shell base and an upper, said upper being adapted to allow for entry of the foot into said ski boot, said latching apparatus having at least two positions, an open position in which the upper is left open to allow for entry of the foot, and a closed position in which the upper is closed around the lower portion of the leg, said latching apparatus being associated with said unlatching means whereby said unlatching means allows for opening of asid latching apparatus without the skier having to bend down, wherein the skier wears first and second boots, wherein said first boot has said latching apparatus and unlatching means



thereon, wherein said unlatching means comprises means for allowing for the opening of said latching apparatus in response to pressure from said second boot on said latching apparatus while the skier maintains his balance on said ski slope.

4,672,756

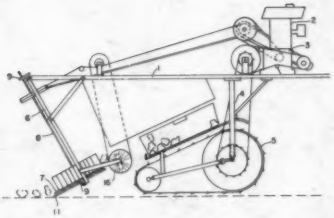
MACHINE FOR GATHERING OYSTERS

Herve Perche, Monsegu, 64470 Tardets, France

Filed Oct. 9, 1985, Ser. No. 785,745

Int. Cl.[4] H01K *80/00*; E02F *5/00*

U.S. Cl. 37—55 **5 Claims**



1. In a machine for gathering oysters, comprising a chassis (1), means (5) supporting the chassis for movement over an oyster bed, the chassis carrying drive means (2 and 3) connected to the support means (5), and gathering means (7) at the forward portion of the chassis; the improvement in which the gathering means is comprised by two flexible circular discs (7) adjacent to each other and each secured centrally on an upwardly extending rotatable axle (8) on an inclined frame (6) of the chassis, the discs having on their upper surface flexible projections (10) that extend radially outwardly from each said axle (8), collection means to the rear of the discs, and a fixed inclined comb (11) below the flexible discs, whereby during movement of the chassis, the oysters raised by the comb are seized by the flexible projections above the discs and are projected rearwardly into said collection means.

4,672,757

DISPLAY SYSTEM

Frank P. Field, 854 Napoli Dr., Pacific Palisades, Calif. 90272

Filed Apr. 11, 1984, Ser. No. 599,196

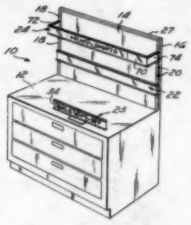
Int. Cl.[4] G09F *3/18*

U.S. Cl. 40—10 R **1 Claim**

1. A display system for displaying objects such as merchandise for sale, comprising:

a header card holder, said header card holder formed as an elongate panel having a generally rectangular surface, a first pair of legs extending from opposite sides on one edge of said rectangular surface to form a first channel for receiving a pair of edges of a header card and a second pair of legs extending from opposite sides on the opposite edge of said panel to form a second channel, said pairs of legs disposed so that said header card holder has a symmetrical design about said rectangular surface whereby said pairs of legs may slidingly receive a header card on opposite sides of a rectangular surface; and

means for mounting the header card holder to a wall, said mounting means comprising means for engaging said pairs of legs on one side of said rectangular surface and means



for mounting the header card holder to a vertically slotted wall:

said elongate panel including a front panel and a pair of side panels substantially perpendicular to the front panel, at least one of the side panels including a third pair of legs extending therefrom to form a third channel and wherein the mounting means includes a bracket having a first arm and a second arm, the first arm having a plurality of hooks extending from one end thereof for directly engaging the slotted wall and a first cross member for engagement with a pair of opposing edges of the third channel, the second arm having a second cross member for engaging an edge of the second channel to support the weight of the header card holder.

4,672,758

DEVICE FOR DISPLAYING ARTWORK

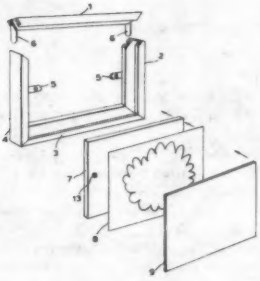
Alex Le-Carpentier, Sandy Lodge Bull Pond Lane, Dunstable Bedfordshire, and Brian Davis, No. 1 Lancotbury Close, Totternhoe Bedfordshire, both of England

Filed Jun. 17, 1985, Ser. No. 745,675

Claims priority, application United Kingdom, Jun. 15, 1984, 8415249

Int. Cl.[4] G09F *1/12*

U.S. Cl. 40—152.1 **10 Claims**



1. A device for displaying a sheet of artwork, comprising a backing board arranged to support substantially the whole of the sheet of artwork, a transparent sheet in front of the backing board, the sheet of artwork being between the backing board and the transparent sheet, a rectangular frame surrounding the backing board and the transparent sheet, the frame having four sections, one of which is releasably secured and removable from the remainder of the frame so as to allow the sheet of artwork to be inserted in a direction parallel to the backing board, and means for rigidly fixing the device to a site location and for spacing the frame from the site location so that said one section can be removed without damaging the site location when said device is rigidly fixed to said site location, the sheet of artwork projecting beyond at least part of the edge of the backing board adjacent said one section so as to be grippable, in order to facilitate selective removal of the sheet of artwork.

4,672,759

ALPHABETIC DISPLAY

Brian Docherty, and Stephen Lambley, both of Felixstowe, England, assignors to British Telecommunications plc, Great Britain

Continuation of Ser. No. 668,784, Nov. 6, 1984, abandoned. This application Mar. 10, 1986, Ser. No. 838,433

Claims priority, application United Kingdom, Nov. 7, 1983, 8329704

Int. Cl.[4] G09F *19/04*

U.S. Cl. 40—450 **13 Claims**

9. A multi-digit display device to be driven by an 8 line driver circuit such as that used for driving a conventional 7 segment plus decimal point display, said display device being capable of displaying capital and lower case letters and being capable of displaying multi-word messages composed from a predetermined repertoire of words, said display device comprising:

an array of consecutively positioned digit displays, each comprising seven individually controllable display segments in a figure-of-eight configuration, and

a first additional controllable display segment located in each of a first plurality of said array of digit displays and having different shapes and positions located within said figure-of-eight configuration, said first plurality of digital displays having display segments which are energizable in different combinations corresponding to each of the vowels in the alphabet and a first set of consonants;

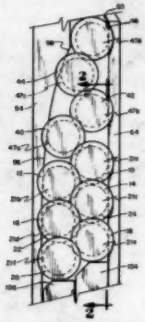
a second additional controllable display segment located in each of a second plurality of said array of digit displays and having different shapes and positions located below said figure-of-eight configuration, said second plurality of digit displays having display segments which are selectively energizable in different combinations corresponding to a second set of consonants,

a maximum of eight segments being located in any digit display, the location and sequence of said first and second linear display segments providing the capability of displaying said predetermined repertoire of words.

4,672,760
SIDE-BY-SIDE CARTRIDGE MAGAZINE FOR RIM-FIRE CARTRIDGES

M. Gaines Chesnut, Kremmling, and Thomas L. Castetter, Elizabeth, both of Colo., assignors to Ram-Line, Inc., Golden, Colo.

Filed Dec. 4, 1985, Ser. No. 805,303
Int. Cl.[4] F41C *25/02*
U.S. Cl. 42—50 23 Claims



1. An apparatus for use in housing rim-fire cartridges in a side-by-side relationship comprising:

first and second side walls;

first and second end walls;

said first and second side walls and said first and second end walls forming a magazine having a chamber, a bottom end, and an opened end, said chamber including a storage zone and a transition zone, at least said storage zone being curved, said curved storage zone being defined using a radius;

a plurality of rim-fire cartridges, each of said rim-fire cartridges having a rim, a body portion, and a nose end, each of said rims of said plurality of cartridges being adjacent to said first end wall, and each of said rims of said plurality of cartridges being in a nested relationship wherein a portion of said rim of each of said cartridges lies between said first end wall and a portion of said rim of a preceding cartridge to prevent crossing of said cartridge rims during movement of said cartridges, at least some of said plurality of rim-fire cartridges being contained in said storage zone in a side-by-side relationship, wherein said rim-fire cartridges in said storage zone include a first rim-fire cartridge, a second rim-fire cartridge and a third rim-fire cartridge, said body portion of said third rim-fire cartridge being contacted by said rim of said first rim-fire cartridge and also by said rim of said second rim-fire cartridge, and wherein said some of said cartridges in said storage zone include a number of each of said first, second and third rim-fire cartridges; and

means for producing a force in said transition zone to provide single file cartridges while avoiding jamming of the cartridges.

4,672,761
SIDEHAMMER PERCUSSION ACTION

Thomas E. Hart, 505 19th St., Canon City, Colo. 81212

Filed May 16, 1986, Ser. No. 863,739
Int. Cl.[4] F41C *19/00*
U.S. Cl. 42—51 4 Claims

1. A muzzle loader firearm action comprising in combination:

a receiver having openings extending therethrough, said openings to accept a hammer, trigger-sear, and safety;

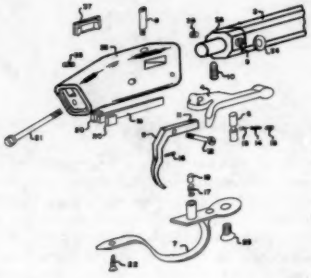
a hammer pivotally mounted within said receiver and arranged alternately to move laterally to and from either of two plane surfaces thereof,

the rear projection of said hammer extending over one said opening in said receiver for engaging said trigger-sear mounted centrally in said receiver,

the side projection of said hammer being provided with a nose selectively engageable with a percussion cap mounted on a nipple on the firearm and provided with a spur to enable said hammer to be moved rotationally about said pivot by pulling rearward parallel to said plane surfaces,

the front projection of said hammer extending over a said opening in said receiver for engaging said safety mounted centrally in said receiver;

spring means mounted centrally within said receiver and arranged to extend between said rear projection of said hammer and a fixed point immediately interior of either said plane surface whereby a given pivotal movement of said hammer compresses said spring means;



a trigger-sear pivotally mounted centrally in a said opening of said receiver and biased into engagement with said rear projection of said hammer and lock means mounted on said trigger-sear for detachably engaging said rear projection of said hammer when said hammer is pivoted away from either of two said plane surfaces of said receiver;

whereby said trigger-sear when actuated dislodges said lock means of said trigger-sear from said rear projection of said hammer causing said spring means to rotate said rear projection of said hammer toward said plane surface causing said nose to engage the percussion cap mounted on the nipple of the firearm; and

a safety means comprising a blocking means located centrally in said opening of said receiver which axially slidably engages said front projection of said hammer when said hammer is pivoted away from either of two said plane surfaces of said receiver thereby the nose of said side projection of said hammer is prevented from engaging a percussion cap mounted on a nipple on the firearm.

4,672,762
SAFETY DEVICE IN A REPEATING RIFLE

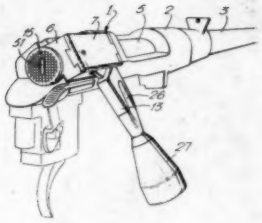
Carl O. L. Nilsson, Armfeldtsvägen 9, S-670 40 Amotfors, Sweden

Filed Apr. 29, 1985, Ser. No. 728,584
Claims priority, application Sweden, May 14, 1984, 8402575; Jan. 7, 1985, 8500044
Int. Cl.[4] F41C *17/08*
U.S. Cl. 42—70.01 8 Claims

1. Device in a repeating rifle with a cylinder bolt mechanism comprising a receiver and a bolt, having a rear part, disposed within said receiver; said bolt having an axis and comprising a bolt body, having a rear and an inside, a mainspring, a firing pin, a rotatable bolt head and a movable handle; said receiver including lock means, lockingly engageable with said bolt

head, for locking said cylinder during firing; said firing pin being axially movable relative to said bolt body; said bolt being axially movable in said receiver to a foremost position;

wherein a cylindrical key-lock which can be locked and unlocked by means of a key is arranged in the center of said rear part of said bolt in said cylinder bolt mechanism with a key hole facing rearwards in said center of said rear part of said bolt, said key-lock comprising a lock plunger which is movable on said inside of said bolt body between a non-locking position and a locking position in which the lock plunger prevents the firing pin and the bolt body from moving axially relative to one another, thereby in



consequence preventing said handle from being moved out of the position it takes when said bolt has been moved to said foremost position in said receiver and said bolt head has been brought into locking engagement with said lock means in said receiver;

wherein a slot is provided on said inside of said bolt body; and

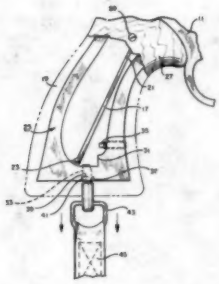
wherein a recess is provided at said rear of said bolt body such that said lock plunger is movable along said slot on said inside of said bolt body between a non-locking position, in which said plunger is situated in said recess at said rear of said bolt body, and a locking position, in which said plunger does not enter said recess.

4,672,763

SAFETY DEVICE FOR PREVENTING THE UNAUTHORIZED FIRING OF A WEAPON BY RELEASING THE HAMMER SPRING

Jerry M. Cunningham, Rte. 3, Box 434P, Fort Worth, Tex. 76140

Filed Aug. 21, 1986, Ser. No. 898,633
Int. Cl.[4] F41C *17/00*
U.S. Cl. 42—70.11 **8 Claims**



1. A safety device for preventing unauthorized firing of a weapon, comprising:

a hammer;

a hollow handle depending from the weapon;

at least one cover, releasably mounted to the handle for providing access to the interior of the handle;

a spring, that engages the hammer, for placing tension on the hammer;

a stop member, in the handle, the stop member being movable from an engaged position, in which the stop member holds the spring in tension, to a released position in which the stop member releases the tension of the spring; and

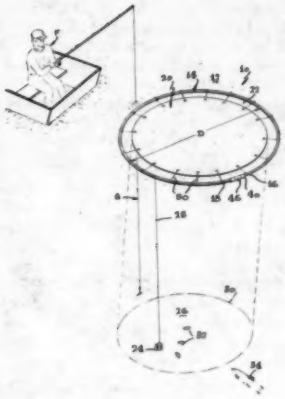
release means, actuated from the exterior of the handle, for moving the stop member to the released position to disable the weapon, the stop member being movable again to the engaged position only by removing the cover of the handle and resetting the spring against the stop member.

4,672,764

PORTABLE GAME FISH ATTRACTING DEVICE

Edward J. Dempsey, 14222 S. Prairie Ave., Hawthorne, Calif. 90250

Filed Oct. 2, 1985, Ser. No. 782,954
Int. Cl.[4] A01K *97/00*
U.S. Cl. 43—4 **7 Claims**



1. A method for creating a fish-attracting region in a body of water, comprising:

providing a coupling member for coupling the ends of a tube, and inflating the tube to urge the tube into a largely circular configuration with a diameter which is a plurality of feet, to make it buoyant;

attaching a flexible, largely opaque, sheet to multiple locations around said tube, with the sheet occupying most of the area within the tube;

floating said tube with the sheet on the body of water, whereby to attract fish to the shadowed area formed by the interception of sunlight by the sheet.

4,672,765

ILLUMINATED FISH ATTRACTION DEVICE

Erno B. Lutz, 850 Rubis Dr., Sunnyvale, Calif. 94087

Filed May 23, 1986, Ser. No. 866,394
Int. Cl.[4] A01K *85/01*
U.S. Cl. 43—17.5 **20 Claims**

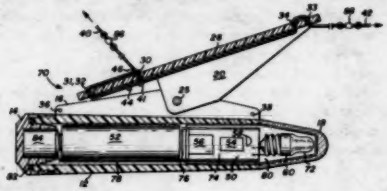
1. A fish attraction device comprising:

an automatic, electrically controlled, flashing light circuit for producing a flashing light at a predetermined frequency, the flashing circuit including a light emitting device having a phosphorescent coating on its outer surface;

a water tight case for housing the flashing light circuit, the case being made of a transparent material about said light

emitting device such that the flashing light from the flashing light circuit inside the case is visible outside the case;

a dorsal fin attached to the case for stabilizing the device in water; and



a water tight cap attached to and forming a water tight seal with the case.

4,672,766

FISHING JIG AND METHOD OF MAKING SAME

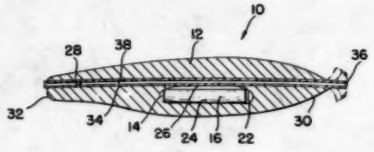
Robert N. Mattison, 5826 McKinley Place North, Seattle, Wash. 98103

Continuation-in-part of Ser. No. 607,284, May 4, 1984, Pat. No. 4,589,221, and a continuation-in-part of Ser. No. 648,458, Sep. 7, 1984, Pat. No. 4,581,839, and a continuation-in-part of Ser. No. 813,677, Dec. 23, 1984. This application Feb. 28, 1986, Ser. No. 835,104

The portion of the term of this patent subsequent to Jul. 8, 2003, has been disclaimed.

Int. Cl.[4] A01K *85/01*

U.S. Cl. 43—17.6 **14 Claims**



1. A jig for attracting fish using a chemiluminescent capsule, comprising:

an elongated, weighted fish-shaped body;

a longitudinally extending cavity in a central portion of said body at least as long as the chemiluminescent capsule for receiving and holding the chemiluminescent capsule therein, said body cavity being formed by elongated and opposed upper and lower interior planar walls of said body spaced apart a distance substantially equal to the diameter of the chemiluminescent capsule such that a capsule can be inserted snuggly therebetween by deforming its resilient outer layer, said cavity having first and second opposed longitudinally extending and light emitting openings at opposite sides of said body communicating with said cavity, at least one of said openings being sized large enough to allow lateral passage of the chemiluminescent capsule therethrough for positioning of the chemiluminescent capsule in said cavity;

a continuous, substantially straight cylindrical bore extending longitudinally and fully through said body from a forward end to a rearward end of said body, said body bore being positioned to intersect one of said upper or lower interior walls and form a recess running lengthwise along said sidewall to provide an expansion location within said cavity at which the capsule can be positioned during usage of the jig; and

a resilient tubular line guide disposed in said body bore, said line guide having a lengthwise bore therein with a low friction, nonchaffing interior wall surface and sized to loosely receive a fishing line, said line guide bore allowing free sliding of the jig along the line and free rotation of the jig about the line during usage, said line guide extending out of said body bore beyond said body forward end and having sufficient resiliency to provide a shock-absorbing action as the jig wobbles on the line during usage.

4,672,767

FISHING BALL

Bertha Solares, 915 Naples St., San Francisco, Calif. 94112

Filed Jul. 13, 1984, Ser. No. 630,854

Int. Cl.[4] A01K *97/04*

U.S. Cl. 43—41.2 **1 Claim**

1. A floating fishing rig for carrying a baited hook out into the water, comprising, an inflatable ball that will float on the water, said ball having a kicking surface, an attached box, said box having a curvature corresponding to the curvature of said ball secured thereto; a pivotal lid hinged to close said box; a catch member having portions on said lid and said box for releasably securing said lid to said box at a location opposite said hindge; a fishing line extending from a rod and reel to the lid portion of said catch member, and continuing and terminating at a fishing hook attached thereto, whereby the ball is kicked out into the water with the hook in said box, and the line from the rod and reel is jerked to release the hook from the box.

4,672,768

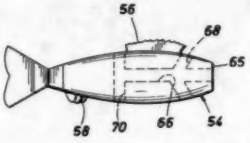
FISHING LURE

Aaron J. Pippert, Houston, Tex., assignor to Utex Industries, Inc., Houston, Tex.

Filed Jan. 27, 1986, Ser. No. 822,748

Int. Cl.[4] A01K *85/00*

U.S. Cl. 43—42.09 **11 Claims**



1. A body adapted to be repeatedly mounted on and dismounted from a head/hook member of a two-piece fishing lure, said body comprising:

an integral member molded of flexible material and having a

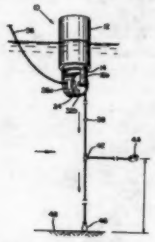
major axial dimension and an outer profile defining the exterior characteristics of the lure and an end face, a pre-formed first bore extending inwardly from said face at least partly through said body parallel to the major axis thereof, a preformed second bore extending substantially normal to and intersecting said first bore at a point spaced from said end face, and at least one preformed third bore spaced from said end face and intersecting said first bore.

4,672,769

ADJUSTABLE FISHING FLOAT

Fayette Thompson, 10728 NE. Halsey, No. A-2, Portland, Oreg. 97220

Filed Jul. 28, 1986, Ser. No. 889,752
Int. Cl.[4] A01K *93/00*
U.S. Cl. 43—43.11 6 Claims



1. A fishing float for attachment to a fishing line, comprising:
a buoyant member;
a pulley mounted to the buoyant member, the pulley freely rotatable about its normal axis; and
a cowling adjacent said buoyant member and surrounding the pulley for retaining the fishing line on the pulley, the cowling spaced less than the diameter of the line from the pulley rim to prevent the line from slipping laterally off the pulley,
the float remaining substantially stationary in the water as the fishing line is passed freely through the float.

4,672,770

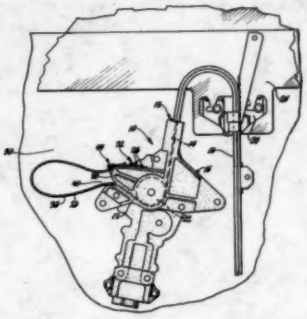
Patent Not Issued For This Number

4,672,771

TAPE DRIVE WINDOW REGULATOR APPARATUS AND METHOD

Michael K. Lam, Southfield; Bohdan Kazewych, Union Lake, and Michael D. Kobrehel, Southgate, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 19, 1986, Ser. No. 864,510
Int. Cl.[4] E05F *11/48*
U.S. Cl. 49—352 13 Claims



1. A vehicle window tape drive regulator comprising:
a tape secured at one end to said window and movable at one end with respect to said vehicle for moving said window between a plurality of window positions;
anchor means securing the other end of said tape in a fixed position with respect to said vehicle;
said tape having a slack portion between the ends thereof which is normally freely movable with respect to said vehicle when said window is in one of said window positions;
guide means providing a predetermined path for said tape when it moves said window and and opening at one end of said path to accommodate said slack portion;
drive means drivably engaged with said tape between said ends thereof and operable in one manner to move said tape to move said window to one window position while creating said slack portion and operable in another manner to move said tape to move said window to another window position while taking up at least some of said slack portion; and
deflection means at said opening between, said path and said anchor means having a first surface towards said anchor and guide means and an opposite cam surface for allowing said drive means to load said tape from an area adjacent to said cam surface to an area adjacent to said first surface, said first surface after said tape loading engaging said slack portion during creation thereof to restrict the movement of said tape with respect to said vehicle.

4,672,772

BALANCED DOOR FOR AIRPLANE LAVATORIES AND THE LIKE

Ichiro Nakamura, 5900 119th Ave. SE., Bellevue, Wash. 98006

Filed Sep. 19, 1986, Ser. No. 909,771
Int. Cl.[4] E05D *15/28*
U.S. Cl. 49—253 13 Claims

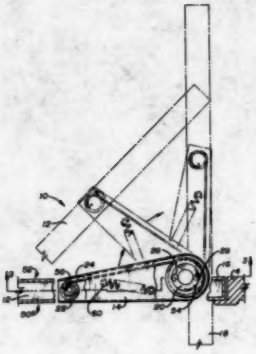
1. A balanced door operating mechanism for use with a door disposed within a door frame, the door frame having a side

jamb substantially parallel to a selected axis of rotation of the door, said operating mechanism comprising:

(a) a fixed wheel fastenable to the door frame substantially adjacent the side jamb thereof so as to be oriented with the axis of rotation of said fixed wheel parallel to the axis of rotation of the door;

(b) a door wheel fastenable to the door substantially coplanar with the fixed wheel so that the axis of rotation of said door wheel is spaced medially from and oriented parallel to the axis of the fixed wheel;

(c) a substantially rigid arm having a proximal end mounted so as to be pivotable around the axis of rotation of the



fixed wheel, and a distal end mounted so as to be pivotable around the axis of rotation of the door wheel, said arm being capable of transferring at least part of the weight of the door to the door frame; and

(d) coupling means for rotationally coupling the door wheel and the fixed wheel such that rotation of said door wheel around the axis thereof in a selected direction produces corresponding rotation of the distal end of the arm in the opposite direction around the axis of said fixed wheel in an amount about ninety degrees (90°) less than the amount of rotation of said door wheel.

4,672,773

MOTOR-OPERATED SLIDING DOOR ASSEMBLY

Michael M. Bilt, 2717 SW. 23rd Cranbrook Rd., Boynton Beach, Fla. 33436

Filed Aug. 13, 1986, Ser. No. 896,014

Int. Cl.[4] E05F *11/00*

U.S. Cl. 49—358 **9 Claims**

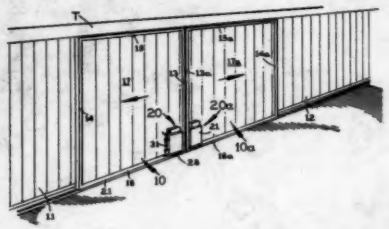
1. In a sliding door for use on a building having a floor and a door opening above said floor, and means for slidably supporting a door section for horizontal movement across said door opening, the improvement which comprises:

a door section having a peripheral frame with a top, bottom and opposite ends and a panel extending across the front of said frame, said frame having a predetermined extend from front to back;

a wheel spaced behind said panel and extending below said bottom of the door frame for rolling engagement with the floor of the building behind said door opening, said wheel having a horizontal axis of rotation extending substantially perpendicular to said panel;

a motor;

drive means acting between said motor and said wheel for imparting rotation to the wheel from the motor;



and housing means supporting said motor, drive means and wheel on the door section behind said panel;

said housing means, motor, drive means and wheel being completely disposed within the front-to-back extent of the door frame so as not to project beyond the door frame.

4,672,774

WINDOW TO BE USED AS A SKYLIGHT OR A FRONT WINDOW

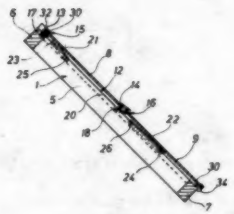
Villum B. K. Rasmussen, Klampenborg, Denmark, assignor to V. Kann Rasmussen & Co., Denmark

Filed Oct. 9, 1985, Ser. No. 785,877

Claims priority, application Denmark, Oct. 15, 1984, 4931/84

Int. Cl.[4] E06B *3/34*

U.S. Cl. 49—371 **7 Claims**



1. A window assembly, comprising:

a frame including a top, a bottom and first and second lateral sides;

an upper window wing having a top edge located adjacent the top of the frame;

means connecting the upper window wing to the first and second lateral sides of the frame for pivotal movement about a first axis between open and closed positions, and including

(i) a first link having a first end pivotally connected to the upper window wing, and a second end connected to the frame for pivotal movement about a second axis fixed relative to the frame, and

(ii) a first hinge connected to the upper window wing, above the first link, and connected to the frame for sliding movement along one of the lateral sides thereof to move the top edge of the upper window wing away from the top of the frame and towards the bottom thereof to thereby produce a space between the top of the frame and the top edge of the upper window wing as the upper window wing is moved from the closed position to the open position;

a lower window wing located below the upper window wing; and

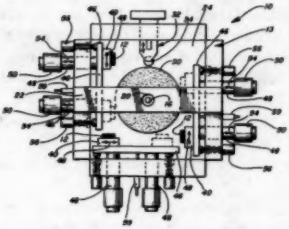
means connecting the lower window wing to the first and second lateral sides of the frame for pivotal movement about a third axis, parallel to the first axis, between open and closed positions, and supporting the lower window wing for sliding movement along the frame toward and away from the upper window wing when the first and second window wing are in their open positions.

4,672,775

METHOD AND APPARATUS FOR GRINDING MULTIPLE WORKPIECES

Kenneth L. Kummer, 105 E. Foster Ave., Roselle, Ill. 60172

Filed Feb. 15, 1985, Ser. No. 702,363
Int. Cl.[4] B24B *9/00*
U.S. Cl. 51—5 R **12 Claims**



1. A method for high production rate grinding of a plurality of workpieces on a grinding wheel rotating about an axis with reduced power consumption, said method comprising the steps of:

(A) mounting each said workpiece in a holding fixture adjacent said grinding wheel to expose a face of each workpiece to be ground at spaced locations around the periphery of said grinding wheel whereby a grinding station is defined at each said location, each said grinding station defining a workpiece feed path generally tangent to the grinding surface of said grinding wheel said feed path having (1) a first portion wherein said workpiece face is out of contact with said grinding wheel, (2) a second portion wherein said workpiece face is in contact with said grinding wheel, and (3) a third portion wherein said workpiece face is out of contact with said grinding wheel, said second portion of said feed path being located between said first and third portions of said feed path, said mounting step including mounting each said workpiece in its fixture while the fixture is initially positioned at said first portion of said feed path;

(B) moving only one of said workpieces in its fixture from the associated feed path first portion into said feed path second portion against said grinding wheel at the corresponding grinding station to grind a face of said one workpiece;

(C) after step (B), moving said one workpiece in its fixture from the associated feed path second portion into said feed path third portion to a position out of contact with said grinding wheel; and

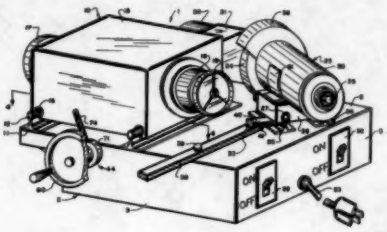
(D) sequentially repeating steps (B) and (C) for each of the remaining said workpieces seriatim.

4,672,776

CIRCULAR BLADE SHARPENING DEVICE

Timothy J. McCullough, 833 Aurora Rd., Vermilion, Ohio 44089

Continuation-in-part of Ser. No. 540,782, Oct. 11, 1983, abandoned. This application May 28, 1985, Ser. No. 737,791
Int. Cl.[4] B24B *3/36*
U.S. Cl. 51—50 R **29 Claims**



1. A sharpening device for the cutting edge of a circular-shaped knife blade of a meat trimming knife after removal of the blade from the knife, said device including:

(a) a base;

(b) a power driven blade holder movably mounted on the base for movement in a predetermined horizontal linear path on said base, said blade holder having an electric drive motor and check means for rigidly mounting the blade for rotation by said motor for preventing relative movement between the blade and the chuck means during sharpeining;

(c) a grinder having a power driven rotating grinding wheel movably mounted on the base for movement in a horizontal linear path which intersected the horizontal linear path of the blade holder whereby the grinding wheel engages and passes beyond the cutting edge of a knife blade mounted on the blade holder at a predetermined angle for sharpening said cutting edge; and

(d) manually actuated sharpening control means for individually reciprocally moving the grinding wheel and blade holder along their respective horizontal paths to bring the wheel into initial contact with the cutting edge of the blade, with said control means further including vernier means for effecting a subsequent predetermined limited horizontal movement along the horizontal linear path of one of the blade holder and grinder to sharpen the blade cutting edge by grinding a predetermined amount of material from the blade by said limited horizontal movement as the other of said blade holder and grinder is reciprocated along its horizontal linear path causing momentary linear crossing contact between the grinding wheel and the blade cutting edge.

4,672,777

KNIFE SHARPENING DEVICE

Albert Dunkin, 15 Ellsworth St., Bridgeport, Conn. 06605

Filed Mar. 6, 1986, Ser. No. 836,847
Int. Cl.[4] B24B *3/54*
U.S. Cl. 51—128 **11 Claims**

1. Knife sharpening apparatus comprising:

a base having a longitudinal axis and having a pair of grooves on its top surface each on opposite sides of the longitudinal axis of said base, each groove being disposed on said surface at an acute angle to the horizontal,

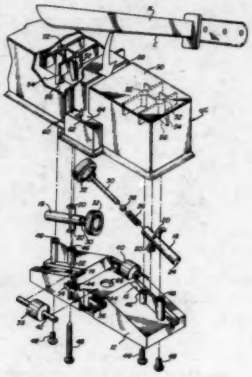
a first and second means on said base each supporting a grinding wheel at an acute angle to the horizontal on opposite sides of the longitudinal axis of said base, each means including

an elongated tube having an open end and a closed distal end,

a shaft connected to said grinding wheel received in said open end of said elongated tube, and

a coil spring between the end of said shaft and said closed distal end of said tube for biasing said shaft away from said closed distal end of said elongated tube,

roller means mounted on opposite sides of said base on opposite sides of the longitudinal axis thereof whose mid-portion is substantially coincident with a centerline



through said base substantially perpendicular to the longitudinal axis thereof,

first and second grinding wheels mounted respectively in said first and second support means having an abrasive surface extending toward each other and having a portion of the circumference thereof extending beyond the centerline of said base,

means for removably connecting each of said elongated tubes to said base in seated arrangement in said grooves.

4,672,778

ROLLABLE KNIFE SHARPENER

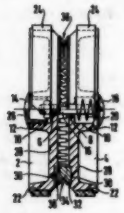
Udo Rieser, Taunusring 28, D-6200 Wiesbaden Delkenheim, Fed. Rep. of Germany

Continuation of Ser. No. 744,905, Jun. 17, 1985, abandoned, which is a continuation of Ser. No. 552,141, Sep. 27, 1983, abandoned. This application Mar. 6, 1986, Ser. No. 837,655

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1982, 3202742

Int. Cl.[4] **B24D** *15/08*

U.S. Cl. 51—354 **20 Claims**



1. A rollable knife sharpener in which the grinding takes place in a direction which is predominantly normal to the cutting edge of the knife, said rollable knife sharpener comprising:

(a) a first roller which is symmetrical about a rolling axis and which has an inside axial surface and an outside axial surface, said first roller having a threaded axial bore extending from its inside axial surface part way therethrough and a first blind bore which is larger in diameter than said threaded bore, which is coaxial with said threaded bore, and which extends from said threaded bore to the outside axial surface of said first roller;

(b) a second roller which is symmetrical about a rolling axis which is coincident with the rolling axis of said first roller, said second roller having the same radial dimensions as said first roller, said second roller having an inside axial surface facing the inside axial surface of said first roller and an outside axial surface, said second roller having a cylindrical axial bore which is larger in diameter than said threaded axial bore in said first roller and which extends from the inside surface of said second roller part way through said second roller and a second blind bore which is larger in diameter than said cylindrical axial bore, which is coaxial with said threaded axial bore, and which extends from said cylindrical axial bore to the outside axial surface of said second roller;

(c) a shaft comprising a threaded first portion threadably received in said threaded axial bore, an unthreaded second portion received in said cylindrical axial bore and said second blind bore, and a head which bears against the outside axial surface of said second roller, the threaded engagement between said threaded first portion of said shaft and said threaded axial bore and the contact of said head with the outside axial surface of said second roller limiting relative axial movement of said first and second rollers, said unthreaded second portion of said shaft being smaller in diameter than said cylindrical axial bore, thereby permitting tilting movement between said shaft and said second roller;

(d) a plug cap closing the axially outer end of said first blind bore;

(e) two substantially coaxially disposed, equally sized toothed rings disposed coaxially between said first and second rollers, one of said toothed rings being mounted on the inner axial surface of said first roller and the outer one of said toothed rings being mounted on the inner axial surface of said second roller, each of said two toothed rings having a large number of generally axially projecting teeth which are sized, shaped, and positioned to intermesh with the teeth on the other one of said two toothed rings, the radially outer peripheries of the teeth on said toothed rings forming a V-shaped gap sized and shaped to receive a knife blade to be sharpened by the rolling movement of said first and second rollers, at least the working surface of the V-shaped gap being formed of a grinding material; and

(f) a compression spring disposed in said second blind bore and bearing again said head of said shaft and said second roller, said compression spring serving to bias said two toothed rings resiliently towards each other,

whereby:

(g) when the sharpener is placed on a planar support and a knife blade is introduced into the V-shaped gap between said two toothed rings, said first and second rollers tilt slightly relative to each other and are forced somewhat apart against the resilient force of said compression spring and the knife blade is firmly gripped between said two toothed rings, and

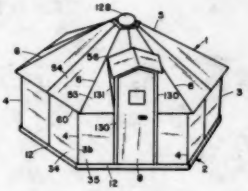
(h) when said first and second rollers are rolled on the planar support, said teeth are caused to grind the knife blade in a direction which is predominantly normal to the cutting edge of the knife blade, thereby cutting minute gouges on each side of the knife blade in the direction perpendicular to its edge.

4,672,779

PORTABLE SHELTER

Clarence J. Boyd, 2595 - 3 Mile Rd., Traverse City, Mich. 49684

Filed Jul. 2, 1981, Ser. No. 280,136
Int. Cl.[4] E04H 1/12
U.S. Cl. 52—79.4 30 Claims



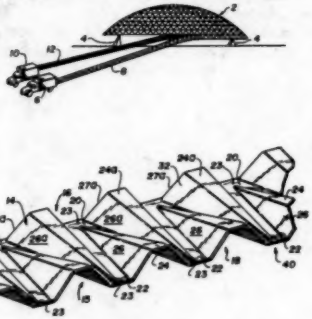
1. A portable shelter comprising:
a collapsible base, including a plurality of legs adapted to be interconnected in a regular, polygonal configuration, and an upwardly oriented channel extending about a marginal edge of said base;
means for detachably interconnecting said base legs;
a collapsible side wall, including a plurality of dihedrally shaped panels, each comprising two sheets rigidly interconnected along a common vertical edge in an obtuse angular relationship which mates with the angle between adjacent legs of said base; each of said panels having a lower edge shaped for reception into the channel in said base, and being adapted for assembly on said base in a side-by-side relationship to form a closed perimeter;
means for releasably and detachably interconnecting said panels;
a roof enclosing a top portion of said shelter; and
means for permitting ingress and egress from said shelter.

4,672,780

BUILDING PANELS

David N. Lockwood, 6191 Ewart Street, Burnaby, B.C., Canada V5J 2X4

Filed Sep. 4, 1984, Ser. No. 647,017
Int. Cl.[4] E04C 2/32, 2/38
U.S. Cl. 52—82 6 Claims



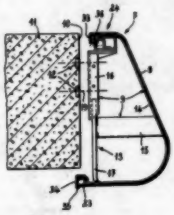
1. An integral, elongated panel strip comprising generally parallel sides and transversely folded converging corrugations alternately extending across the panel in opposite directions, each corrugation having at least three sloping triangular faces which converge at their apexes, said corrugations having insloping side edges, each side edge of a panel strip being identically shaped such that either side edge can mate congruently with either side edges of a corresponding panel strip.

4,672,781

CORNICE FOR BRIDGE, VIADUCT, OR THE LIKE

Joseph Pichon, Decines, France, assignor to Societe Anonyme Dite "l'Equipement Routier" , Meyzieu, France

Filed Jul. 3, 1985, Ser. No. 752,305
Claims priority, application France, Jul. 4, 1984, 84 11049; Oct. 19, 1984, 84 16459
Int. Cl.[4] E01D 19/10
U.S. Cl. 52—94 16 Claims



1. A cornice for a construction work having an upright surface, the cornice comprising:
a plurality of similar, elongated, and flexible panels of like section and predetermined length, the panels being laterally concave and having a pair of parallel longitudinal edges and opposite longitudinal ends;
a plurality of respective rigid mounts each generally complementary to the concave section of the panels;
means for anchoring the mounts on the surface spaced apart by a distance equal to the length of the panels;
means including interengaging formations on the mounts and on the edges of the panels for hooking the panel edges to the mounts, one of the mount formations being movable on the mount with the respective edge formation; and
tensioning means for displacing the one movable formation on the mount and thereby pulling the respective panel snug against the mount and also securing the respective panel to the respective mount.

4,672,782

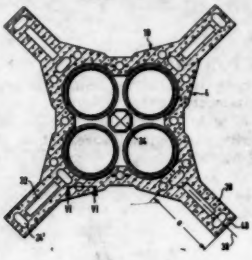
SMOKESTACK OR TOWER OF PRECAST REINFORCED CONCRETE MODULES

Georg-Gerd Richter, Treppenstrasse 9, D-6109 Muhltal 1, Fed. Rep. of Germany, and Alfons O. Krautz, 10 Old Field Wood Rd., Old Field, N.Y. 11733

Filed Mar. 12, 1984, Ser. No. 588,307
Claims priority, application Fed. Rep. of Germany, Dec. 2, 1983, 3343721
Int. Cl.[4] E04H 12/28
U.S. Cl. 52—218 2 Claims

1. A high, self-supporting smokestack or tower having a structure constructed by stacking precast reinforced concrete sections one upon the other, the cross-sectionanl area of the structure being larger at the bottom than at the top concentrated reinforcement being provided along the length of the structure to bear horizontal forces acting on the smokestack or tower, characterized in that the structure exhibits ribs (28) provided with concentrated reinforcement (36) and extending longitudinally on the outside of the structure at least along its lower portion, the radial extent of these ribs (28) increasing from the top to the bottom at lease so as to correspond essen-

tially to the bending moment progression resulting from the horizontal forces and wherein the smokestack or tower includes a central shaft of the structure which has a cross-section which remains constant from the top to the bottom.



4,672,783

FRAME FOR A VEHICLE SUN ROOF

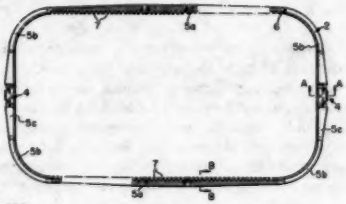
Jeffery A. Frampton, Begnins, Switzerland, assignor to Idex Limited (Jersey), St. Helier, United Kingdom

Filed Oct. 15, 1985, Ser. No. 787,323

Claims priority, application United Kingdom, Oct. 12, 1984, 8425774

Int. Cl.[4] E04C 3/10

U.S. Cl. 52—224 **9 Claims**



1. A frame adapted to grip the edges of and thereby fixedly surround an aperture in a panel, said frame comprising:

a first frame component adapted to be located around the aperture on one surface of the panel, said first frame component having a top face adapted to overlie the one surface of the panel and an inclined inner face extending from said top face and adapted to be located within the aperture;

an inwardly deformable second frame component adapted to be located around the aperture of the other surface of the panel, said second frame component having an edge face with an incline similar to said inclined inner face on said first frame component and being positively curved at all points around its periphery;

a tensioning means around said edge face of said second frame component; and

means for tightening said tensioning means so as to deform said second frame component;

said first and second frame components being complementarily formed so that upon tensioning and deformation of said second frame component said edge face on said second frame component rides up said inclined inner face on said first frame component to clamp said frame components together within the aperture and to grip the edge of the panel around the aperture.

4,672,784

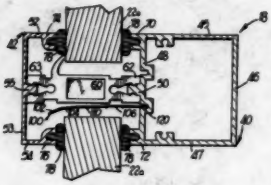
WALL FRAMING SYSTEM WITH AN INTERNAL WATER DEFLECTOR

Trent L. Pohlar, 319 Christina Dr., Whiteland, Ind. 46184

Filed Sep. 25, 1985, Ser. No. 779,887

Int. Cl.[4] E04B 1/66

U.S. Cl. 52—235 **5 Claims**



1. A wall framing system comprising:

a plurality of panels supported by a plurality of spaced and intersecting vertical and horizontal mullions;

a water deflector mounted internally of each horizontal mullion, each of said water deflectors running continuously the length of said horizontal mullion and extending into the intersection of said horizontal mullion and said vertical mullion;

means along the interior section of each of said horizontal mullions for receiving said water deflector, wherein said means for receiving said water deflector comprises a keeper channel in each of said horizontal mullions, said keeper channel running the length of said horizontal mullion; and

means for securing said water deflector within said keeper channel, wherein said securing means comprises at least one mounting flange beveled away from said inner edge so as to project outwardly therefrom, whereby said mounting flange fits snugly within said keeper channel to retain said water deflector within said horizontal mullion, thus providing a continuous sealing arrangement such that infiltrated water may not pass below said water deflector and is directed to the exterior of said mullion.

4,672,785

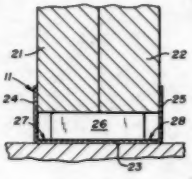
MODIFIED RUNNER AND AREA SEPARATION WALL STRUCTURE UTILIZING RUNNER

E. Vincent Salvo, Pleasantville, N.Y., assignor to United States Gypsum Company, Chicago, Ill.

Continuation of Ser. No. 708,027, Mar. 4, 1985, abandoned. This application Jul. 17, 1986, Ser. No. 888,093

Int. Cl.[4] E04B 2/84

U.S. Cl. 52—241 **5 Claims**



1. An integral substantially U-shaped runner for supporting a pair of panels in face-to-face engagement positioned therein, comprising:

(a) a web,

(b) a pair of flanges extending perpendicularly one from each edge of said web and defining a channel therewith,

(c) portions of said web being struck therefrom to provide

rigid tabs displaced inwardly into said channel transversely to the longitudinal direction thereof, said inwardly displaced tabs struck from said web each comprising an upwardly directed tab member and a downwardly directed tab member connected together at a crease and being mutually integral,

said tab members cooperating to define inverted-V shaped tabs, the crease connecting said tab members adapted rigidly to support the lower edges of said wallboard panels,

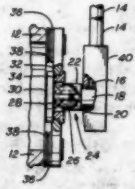
whereby, when said panels are inserted into said runner, the creases connecting said tab members rigidly support the lower edges of both said panels elevated at a distance above said web sufficient to prevent water which may be present in said channel from contacting the edges of said panels.

4,672,786

VALVE SEAT GRINDING APPARATUS

James M. Peppers, Houston, Tex., assignor to Unislip, Inc., Merriville, Ind.

Filed Mar. 24, 1986, Ser. No. 843,292
Int. Cl.[4] B24B *15/02*
U.S. Cl. 51—241 VS **4 Claims**



1. Apparatus for grinding a valve seat face comprising:

(a) a grinding head means adapted to become aligned with a designated valve seat responsive to force applied to said grinding head and to properly grind said valve face responsive to torque sufficient to rotate said grinding head;

(b) an articulated torque transfer coupling means connected to said grinding head at its axis and adapted to transfer torque and axial force to said grinding head to cause rotation of said head and thereby to cause a grinding action between said grinding head and said valve seat;

(c) said torque transfer coupling means including a driven torque member connected with said grinding head and a driving torque member connected to a power drive source, wherein the axes of said grinding head and said power drive source may vary from being in alignment to being in substantial misalignment;

(d) a torque transfer member in connection with said torque members;

(e) each torque member of said torque members including a circular torque transfer spline with the axis of said spline disposed perpendicular to the axis of each said torque member;

(f) said spline having an opening of designated internal distance located at one end of said torque member and centered with the axis of said torque member;

(g) a pair of circular torque transfer grooves defined into said torque transfer member and crossing at right angles on each side of said torque transfer member to form a pair of intersections;

(h) said intersections forming flat clearance surfaces with a distance between said clearance surfaces being less than said designated distance of said internal diameter of said opening;

(i) a splineway opening defined through the circular spline and across the axis of at least one of said torque members to accommodate passage of the spline of the other said torque member of said torque members;

(j) at least one of said torque members merging into a circular mounting flange with said mounting flange being connected into said grinding head with assistance of a retainer bushing; and

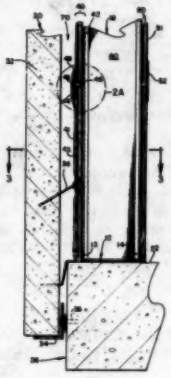
(k) the internal diameter of said retainer bushing limiting the angle of deviation of the driving torque member from the driven torque member.

4,672,787

WALL SYSTEM CONSTRUCTION, PARTS AND METHODS OF ASSEMBLY

John J. Murphy, P.O. Box 886, Valley Forge, Pa. 19481-0886

Filed Oct. 25, 1985, Ser. No. 791,254
Int. Cl.[4] E04B *1/60, 1/64*
U.S. Cl. 52—409 **14 Claims**



1. In a three wall system installed near an outer perimeter of a multi-story building comprising a moisture permeable inner wall, a moisture permeable masonry outer wall exposed to the elements and a middle wall formed of moisture permeable rigid adjoining panels the improvement comprising:

moistureproofing material means covering the outer wall facing side of said rigid panels and covering and at least partially filling the seams between adjoining pairs of said panels sufficiently for closing said rigid panels and said seams to water and vapor passage; and

flexible strip means embedded in said moistureproofing material means overlying said seams and adjoining edges of said pairs of adjoining panels on either side of said each of said seams for supporting said moistureproofing material means over said seams.

4,672,788

METHOD AND DEVICE FOR REPAIRING VINYL SIDING AND THE LIKE

Brian H. VanTosh, 377 Hayward Ave., Rochester, N.Y. 14609

Continuation-in-part of Ser. No. 797,395, Nov. 12, 1985. This application Sep. 2, 1986, Ser. No. 902,498
Int. Cl.[4] E04D *1/00*
U.S. Cl. 52—514 **4 Claims**

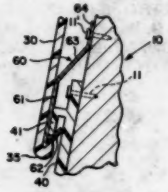
1. In combination with a pair of like, adjacent siding panels, each of which is secured by first means adjacent its upper edge, and one above the other, to a wall, and with a rearwardly facing, hook-shaped portion along the lower edge of the upper panel overlying a downwardly facing hook formed on the face of the lower panel adjacent its upper edge, a siding saving device separate and independent of said first means, comprising

a generally flat body portion extending between the down-

wardly facing hook on said lower panel and the overlying portion of said upper panel,

a flange portion integral with and offset above and rearwardly of, the upper edge of said flat body portion, and disposed to be secured to said wall beneath the overlying portion of said upper panel, and

a rearwardly facing hook formed along the lower edge of said body portion, and disposed to have a marginal portion along its upper edge positioned slidably beneath and



in engagement with said downwardly facing hook on said lower panel, and

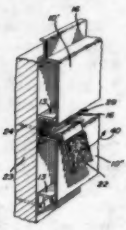
said rearwardly facing hook-shaped portion on the lower edge of said upper panel disposed to be snapped or urged resiliently into place over said lower edge of said body portion of the device so as to engage and extend at least part way around the outside of said rearwardly facing hook on said device to be held thereby against movement relative to said lower panel.

4,672,789

SURFACE COVERING EXTRUDED PANEL STRIP

Guy Fortier, 100 Des Patriotes Nord, St. Hilaire, Quebec, Canada J3H 3H1

Filed Mar. 31, 1986, Ser. No. 845,945
Int. Cl.[4] E04D *1/00*
U.S. Cl. 52—520 **10 Claims**



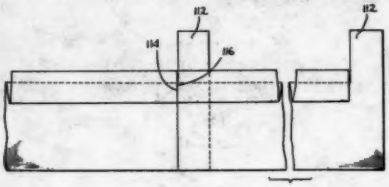
1. A surface covering extruded plank comprising a wall surface portion having opposed transverse end walls, each said end wall terminating in a support flange, each of which extends in a common plane substantially parallel to the planar surface of said wall surface portion, one of said transverse end walls having a fastener concealing wall extending transverse thereto and above said wall surface portion, the other of said end walls having a plank securing flange constituted by an extension of one of said support flanges, said other of said end walls further having a recessed portion disposed inwardly of an edge portion of said wall surface portion, said wall surface portion, a guide rib in said recess portion defining a rear channel for receiving a portion of said concealing wall of an adjacent plank and a front load connector holding channel, said fastener concealing wall having a load transfer rib in a free end thereof which extends in a rearward direction toward said support flange, said load transfer rib extending parallel to said one of said transverse end walls and terminates in an abutment edge disposed in a plane spaced from a rear surface of said support flanges a distance equal to the thickness of said securing flanges whereby to abut against said panel strip securing flange of an adjacent plank.

4,672,790

MULTI-PIECE ASPHALT COMPOSITION ROOFING SYSTEM

Bennie Freiborg, 4536 Indiana Ave., La Canada, Calif. 91011

Continuation of Ser. No. 356,937, Mar. 10, 1982, abandoned. This application Oct. 11, 1985, Ser. No. 786,732
Int. Cl.[4] E04D *1/00*
U.S. Cl. 52—521 **29 Claims**



24. An asphalt roof covering system comprising:

a plurality of bases of asphalt composition material, each base characterized by a top granular surface and a lower surface having a first base fold line dividing the base into first and second portions, and having a slit proximate one end of said base extending perpendicularly through said second portion to said first base fold line to provide a tab, wherein the width of said tab is substantially narrower than the width of said base,

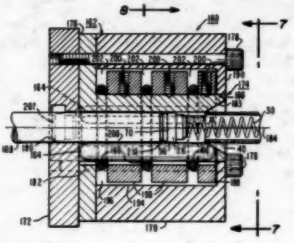
each of said bases being folded about said first base fold line such that the top granular surface of the second portion overlies the top granular surface of said first portion, said tab being left unfolded, said bases to be installed upon a roof in courses, the folded region adjacent one side of a base overlying a portion of the adjacent base which is adjacent the tab of said adjacent base, and the first base portion of the bases in one course overlying the folds in a next lower course of bases.

4,672,791

APPARATUS FOR APPLYING AN END PLUG TO AN END OF A FUEL ROD TUBE

Stuart L. Rieben, and Mark E. Wylie, both of Mt. Lebanon Township, Allegheny County, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 678,519, Dec. 5, 1984. This application Jun. 12, 1986, Ser. No. 873,647
Int. Cl.[4] G21C *3/10*
U.S. Cl. 53—327 **3 Claims**



1. An end plug applying apparatus for applying an end plug to a hollow tube end of a nuclear fuel rod such that a frictional

interfitting engagement will be established between the end plug and the tube end facilitating the formation of a connection therebetween which hermetically seals the fuel rod, said apparatus comprising:

(a) a housing having spaced inlet and outlet ends, said inlet end adapted to receive the end plug and said outlet end adapted to receive the tube end to which the plug is to be applied;

(b) guide means disposed in said housing and having internal surface portions which define an internal guide channel aligned in tandem with said inlet and outlet ends of said housing along a common axis and being of a cross-sectional size smaller than that of an outer external surface of the end plug, said guide means being yieldably expandable radially with respect to said common axis;

(c) means defining an infeed opening adjacent said inlet end of said housing and displaced laterally of said common axis through which the end plug is fed in a direction extending toward said common axis to a loading position in front of said inlet end of said housing; and

(d) means disposed adjacent said inlet end of said housing and movable along said common axis for engaging and moving the end plug from said loading position in front of said inlet end, through said inlet end and through said guide channel, to said outlet end, said movement of said plug through said guide channel causing yieldable expansion of the cross-sectional size of said guide means such that said surface portions of said guide means conform to the outer external surface of the end plug and maintain guiding contact therewith as the end plug is moved through said guide channel;

(e) said housing includes

a series of elongated recesses spaced from one another about said common axis and aligned generally parallel to one another and with said common axis, and

a series of circumferential slots spaced from one another along said common axis and intersecting said elongated recesses; and

said guide means including

a plurality of elongated generally cylindrical rolls, each roll being mounted in one of said recesses such that said rolls are maintained spaced apart from one another about said common axis, disposed generally parallel thereto and to one another and movable radially toward and away from said common axis, said each recess having an inner end defining an elongated opening of a width less than that of said roll such that said rolls have longitudinally-extending surface portions exposed and facing toward one another through said openings so as to define said guide channel therebetween, and

a plurality of resiliently expandable elements circumscribing said housing within said respective circumferential slots therein and stretched about said plurality of rolls so as to bias said rolls toward said inner ends of said recesses, said elements yieldably allowing movement of said rolls away from said inner ends of said recesses upon contact of said facing surface portions of said rolls with the outer external surface of the end plug for establishing and maintaining guiding contact with the end plug as the same is moved through said guide channel between said inlet and outlet ends.

4,672,792

ARRANGEMENT IN A SEALING MACHINE

Kay Wallin, Halmstad, Sweden, assignor to Sprinter System AB, Sweden

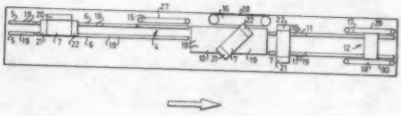
PCT No. PCT/SE85/00121, § 371 Date Nov. 12, 1985, § 102(e) Date Nov. 12, 1985, PCT Pub. No. WO85/04152, PCT Pub. Date Sep. 26, 1985

PCT Filed Mar. 14, 1985, Ser. No. 817,735

Claims priority, application Sweden, Mar. 14, 1984, 8401435

Int. Cl.[4] B65B 7/20, 7/26

U.S. Cl. 53—374 5 Claims



1. A package sealing machine having at least one conveyor for the packages and a plurality of positioning and constraining means spaced along said conveyor for positioning, constraining and closing packages on said conveyor;

each package having a lower side and an upper side opening defined by at least one longitudinal closing flap;

said package also having side flaps at said upper side opening;

said conveyor comprising one or more belts running side-by-side in the same plane;

a vacuum source;

a connection between said vacuum source and the lower surface of the conveyor;

said positioning and constraining means comprising perforations in and through said conveyor, the upper openings of said perforations terminating at the upper surface of the conveyor, being adapted to abut any package deposited thereon;

the lower opening of each perforation being adapted to be connected to said vacuum source as the conveyor traverses said vacuum source;

the upper openings of said perforations co-acting with the underside of packages placed on said conveyor to position said packages on the belts by means of the suction through said upper openings; and

an additional conveyor in the positioning region to assist in positioning the packages and to participate in closing and sealing the opposite or upper side of each package;

said additional conveyor also having perforations which may be brought into communication with said vacuum source;

said additional conveyor comprising at least one belt running on edge above and at approximately right angles to said first-mentioned conveyor to engage the upper side of each package to press down and seal said longitudinal closing flap; and

a third conveyor and a friction belt;

said third conveyor receiving each package from said first conveyor and the additional conveyor to cooperate with said friction belt to turn said package 90° in a horizontal plane; and

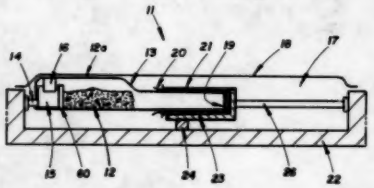
a fourth conveyor having hold down belts to engage and seal the side flaps of each package;

at least one belt conveyor engaging the upper side of each package in the flap sealing area.

4,672,793
MOLDED MEAT VACUUM PACKAGING

Frank M. Terlizzi, Jr., Clemson, S.C., and Bernardus G. Langen, Oeffelt, Netherlands, assignors to W. R. Grace & Co., Duncan, S.C.

Filed Jan. 6, 1984, Ser. No. 568,772
Int. Cl.[4] B65B *31/00*
U.S. Cl. 53—434 1 Claim



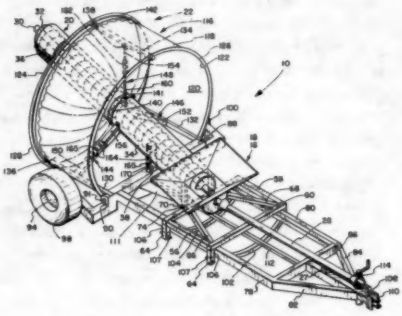
1. In a method for vacuum packaging a moldable meat product, including the steps of:
(a) loading a moldable meat product into a stuffing horn of a meat stuffer within a vacuum chamber;
(b) placing a heat shrinkable, cook-in thermoplastic bag onto said horn, and then a cooking mold over said bag so that said bag lines said mold, the length of said bag being greater than the length of said mold to define a bag neck portion;
(c) vacuumizing said chamber; and after a holding period sufficient to deaerate said meat,
(d) advancing said meat from said horn to fill the bag lined mold;
(e) substantially removing meat from within said bag neck;
(f) retracting said mold from said horn and closing said bag neck by gathering and clipping; and
(g) venting said vacuum chamber, improvement comprising:
(i) coincidentally with advancing said meat, advancing a disposable plate behind said meat into said bag lined mold;
(ii) coincidentally with advancing said plate, expelling meat trailings from the bag neck;
(iii) closing said bag neck around said plate, the shape of said plate corresponding to the transverse cross sectional shape of said horn;
(iv) the steps of the method being accomplished while the meat is under continuous vacuumization.

4,672,794
APPARATUS AND METHOD FOR PACKING BULK MATERIAL IN PLASTIC BAGS

Maynard L. Good, 23257 County Rd., 18 E., Rte. 7, Elkhart, Ind. 46514

Filed Jul. 29, 1985, Ser. No. 760,336
Int. Cl.[4] B65B *9/00, 25/02*
U.S. Cl. 53—440 31 Claims

25. An improved apparatus for packing bulk material in plastic bags, comprising:
a frame having a substantially horizontally disposed rail assembly;
means supported on said frame for transferring bulk material between a first position and a second position and into a plastic bag as an adjustably directed stream, said transferring means including:
means for removably mounting said transferring means on said frame,
a housing,
means for releasably and pivotally mounting said housing on said removable mounting means,
means for receiving said bulk material, and
means communicating with said receiving means for delivering said bulk material into said plastic bag;
means for creating a rotating wedging action against said transferred bulk material in said plastic bag, said means including:
means rotatably mounted within said housing and extending beyond said delivering means for actuating said transferring means,
a helical flange member mounted along the longitudinal axis of said actuating means,
a drive member attached to said actuating means for use with a power source to transmit a rotating motion to said actuating means, and
means for guiding one end portion of said delivering means into said plastic bag at a vertically disposed position relative to another end portion of said delivering means whereby said bulk material is delivered within said plastic bag as a generally obliquely directed rotating stream of bulk material;
means for adjusting said rotating wedging action means within said plastic bag to accommodate packing characteristics of said bulk material and to effect a desired density of packed bulk material said adjusting means including:
a bonnet member movably mounted on said housing and adapted to adjustably expose a determined length of said helical flange member beyond said housing and within said plastic bag; and



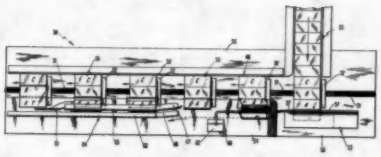
means substantially resiliently responsive to pressures exerted by said characteristics of said transferred bulk material for urging said transferred material into said plastic bag.

31. A method for packing bulk material in plastic bags comprising the steps of:
positioning a transferring device on a support frame for use with a towing vehicle;
mounting a guiding device on said support frame adjacent said transferring device;
securing one end of plastic tubing over one end of said guiding device and tying an opposite end of said plastic tubing to form a bag;
enclosing a delivering end portion of said transferring device intermediate a wall member within said guiding device and the tied end of the plastic tubing;
transmitting rotating motion to an actuating device rotatably mounted in said transferring device; and
introducing bulk material into an inlet portion of said transferring device; and then
locating and exposing a certain length of said actuating device within said bulk material within said plastic bag to provide an acceptable level of density both for ensilage of agricultural products and for storage of bulk material.

4,672,795
METHOD OF HANDLING FIFTH PANEL PACKAGES AND ASSEMBLY THEREFOR

James Alexander, Cedar Knolls, and Wilhelm B. Bronander, III, Upper Montclair, both of N.J., assignors to Scandia Packaging Machinery Co., Clifton, N.J.

Filed Dec. 6, 1985, Ser. No. 806,153
Int. Cl.[4] B65B 35/56
U.S. Cl. 53—446 39 Claims



1. A method of handling packages having a panel extending outwardly from one side of the package and along one edge thereof, said method comprising the steps of:

(a) providing a plurality of said packages with the extending panel of each package disposed in the same direction,

(b) said packages of said plurality being contiguously nested with respect to each other with each extending panel, except for the panel of an end package, overlapping the side of the next adjacent juxtaposed package,

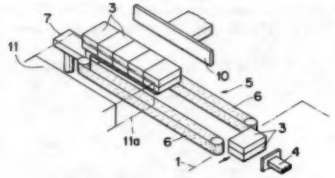
(c) said plurality of the nested packages including an end package with its extending panel directed outwardly from said plurality of the nested packages, and

(d) rotating the end package and placing the extending panel thereof in an overlapping relationship with respect to the next adjacent juxtaposed package.

4,672,796
CONTROL METHOD OF STOP WAITING OPERATION IN COLLECTIVE PACKING MACHINE

Shuichi Ono, Tokyo; Satoru Aida, Sanjo, and Kinshiro Hoshino, Nakanokuchi, all of Japan, assignors to The Japan Tobacco & Salt Public Corporation, Tokyo and Sanjo Machine Works Ltd., Nigata, both of, Japan

Continuation of Ser. No. 634,955, Jul. 27, 1984, abandoned. This application Sep. 10, 1986, Ser. No. 906,602
Claims priority, application Japan, Jul. 28, 1983, 58-138607
Int. Cl.[4] B65B 11/58, 57/16
U.S. Cl. 53—449 2 Claims



1. In a method of control of the operation of a collective packing machine of the type having a first packing machine with a first driving source, and a first main shaft rotated by said first driving source, a second packing machine with a second driving source and a second main shaft rotated by said second driving source, and a clutch placed between said second driving source and the second main shaft of said second packing machine and having an input shaft rotated by said second driving source and an output shaft connected to the second main shaft, and wherein said first packing machine operates continuously to produce plural sets of packed articles one by one, said plural sets of packed articles being delivered one by one with spacings therebetween and being aligned in front of the said second packing machine, and said second packing machine operates for stop waiting operation to pack plural sets (n) of the packed articles aligned in front thereof in each cycle of the operation thereof, said first main shaft and said second main shaft being rotated at a predetermined ratio of speed with respect to each other during operation of said second packing machine, said second packing machine being controlled to start and to stop its operation by connecting and disconnecting said clutch;

which method comprises the steps of

controlling, while said second packing machine is in stop waiting state, the speed of revolution of the input shaft of said clutch by comparing the speed of revolution of said first main shaft with the speed of revolution of said input shaft of said clutch so as to maintain the ratio of these two speeds at a predetermined value;

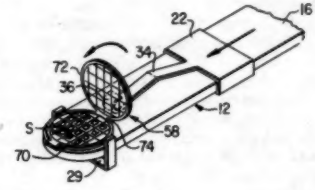
starting, when operation of said second packing machine is to be started, connection of said clutch earlier by a time increment Ts in advance of rotation of angle 0° of said first main shaft corresponding to rotation angle 0° of said second main shaft in one cycle of said second packing machine, said time increment Ts being selected depending on the speed of revolution of the first main shaft of said first packing machine so as to bring operation of said second packing machine into synchronization with the operation of said first packing machine at the time of completion of connecting said clutch, said time of completion of connecting said clutch being when speed of the output shaft of said clutch coincides completely with rotation of the input shaft of said clutch, said second packing machine completion its operation at the same time as starting of connecting said clutch; and

maintaining, following the completion of connecting said clutch, the operation of said second packing machine to synchronization with said first packing machine by varying the ratio of speed between said first packing machine and said second packing machine by increasing or decreasing the speed of said second packing machine.

4,672,797
METHOD AND APPARATUS FOR SECURING AND TRANSFERRING GRID SPECIMENS

Herbert K. Hagler, Dallas, Tex., assignor to Gatan, Inc., Pleasanton, Calif.

Filed Jun. 21, 1985, Ser. No. 747,255
Int. Cl.[4] B65B 5/04, 7/26, 67/02
U.S. Cl. 53—467 22 Claims



1. A method for transferring a specimen contained in a holder from a first workstation to a second workstation, comprising:

spring loading a spring clip mounted on a transfer arm against an upper surface of the transfer arm;

pressing the transfer arm downwardly on a block in order to force the spring clip away from the upper surface;

placing a first portion of the holder between the spring clip and the upper surface;

releasing downward pressure on the transfer arm such that the spring clip secures the first portion to the upper surface;

depositing a specimen on the first portion of the holder at the first workstation;

folding a second portion of the holder over the first portion to close the holder over the specimen;

moving the transfer arm from the first workstation to the second workstation; and

releasing the holder from the transfer arm.

4,672,798

APPARATUS FOR CUTTING GRASS

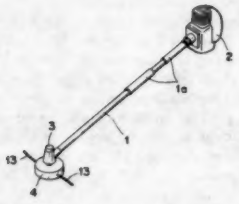
Keizo Ota, Ibaragi, Japan, assignor to Shingu Shoko, Ltd., Otaru, Japan

Filed May 23, 1986, Ser. No. 866,503

Claims priority, application Japan, May 24, 1985, 60-110248; Mar. 7, 1986, 61-48624; Mar. 11, 1986, 61-51494

Int. Cl.[4] B26B *7/00*; A01D *35/26*

U.S. Cl. 56—12.7 9 Claims



1. An apparatus for cutting grass comprising

a rotatable head rotatable about an axis in a predetermined direction, said rotatable head connected to a drive source through switch means, said rotatable head including an upper case and a lower case releasably engaged with each other, said upper case and said lower case having respective inner surfaces, said lower case having an opening at a central bottom portion thereof;

a reel supported within said head slidably along said axis and wound with at least one cord therearound, said at least one cord being wound in a direction reverse to said predetermined direction, said reel having an upper flange and a lower flange, said upper flange, and said lower flange having upper and lower outer surfaces, respectively;

a depressing member extending from said reel and normally biased toward said central bottom portion of the lower case to project outside the rotatable head through said opening;

a plurality of first ratchet teeth formed in said upper outer surfaced of said upper flange and a plurality of second ratchet teeth formed in said inner surface of said upper case, said first and second ratchet teeth being formed annularly to face each other, each first tooth having a first slant surface facing forwardly and a first tip formed at a rearwardmost end of said first slant surface with respect to the head rotation in said predetermined direction, each second tooth having a second slant surface facing rearwardly and a second tip formed at a forwardmost end of said second surface; and

a plurality of recesses formed in said inner surface of said lower case and a plurality of projections formed in said lower outer surface of said lower flange, said recesses and said projections being sized to permit engagement with each other: and

said second ratchet teeth of the upper case and said recesses of the lower case being spaced from each other by a predetermined distance such that engagement of said first with second ratchet teeth and engagement of said recesses with projections are selectively accomplished, said first tip of each first tooth being positioned rearwardly of said second tip of each second ratchet tooth during said engagement of said recesses with projections when said rotatable head is rotated.

4,672,799

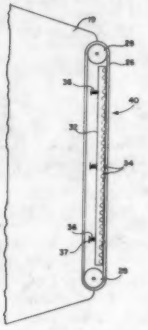
RIDING MOWER SIDE GUARD

Bruce A. Parish, 609 E. Prosser #4, Cheyenne, Wyo. 82007

Filed Jun. 17, 1985, Ser. No. 744,952

Int. Cl.[4] A01D *35/14*, *53/08*

U.S. Cl. 56—17.4 7 Claims



1. In a riding mower of the type having cutting means carried within a housing, wherein said cutting means comprises a blade adapted to rotate in a horizontal plane, and wherein said housing extends over the top side and the ends of said blade, wherein the improvement comprises movable guard means disposed on one side of said housing, said guard means being adapted to move relative to said housing when said guard means contacts a stationary object while said riding mower is moving; wherein said movable guard means comprises a flexible endless belt which is adapted to rotate around two rotatable support pulleys carried by said housing; wherein an elongated guide member is disposed between said support pulleys, wherein a plurality of rotatable rollers are carried by said guide member, wherein said guide member is biased outwardly in a manner such that said rotatable rollers are urged against the back side of said belt, and wherein said belt and said guide member are adapted to be deflected inwardly when said belt contacts a stationary object.

4,672,800

PROCESS AND APPARATUS FOR MAKING A YARN

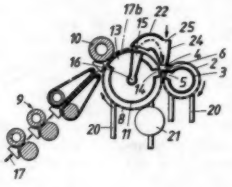
Ernst Fehrer, Auf der Gugl 28,, A-4020 Linz, Austria

Filed May 30, 1986, Ser. No. 868,576

Claims priority, application Austria, Oct. 24, 1985, 3070/85; Nov. 21, 1985, 3390/85; Jan. 20, 1986, 118/86; Mar. 13, 1986, 658/86

Int. Cl.[4] D01H *1/135*, *7/885*, *5/28*; D02G *3/36*

U.S. Cl. 57—5 16 Claims



1. In a process of making a covered yarn comprising a core consisting of core fibers and a covering consisting of covering fibers wound around said core, which process comprises

twisting a stream of drawn core fibers in a generally triangular twisting space defined by two juxtaposed, closely spaced apart twisting drums rotating in the same sense, and

winding said covering fibers around said core fibers as they are twisted in said twisting space, whereby a covered yarn is formed,

the improvement residing in that

a drawn roving is moved on the circumference of a rotating feed roller into said twisting space and is subjected to a vacuum tending to hold said roving on said circumference,

said roving is divided on said circumference into first and second streams consisting of said core fibers and covering fibers, respectively,

said first stream is moved on said circumference while the action of said vacuum on said first stream is maintained, and

said covering fibers are detached from said feed roller and are caused to fly freely into said twisting space.

4. In apparatus for making a covered yarn comprising a core consisting of core fibers and a covering consisting of covering fibers wound around said core, which apparatus comprises

two juxtaposed, closely spaced apart twisting drums defining a generally triangular twisting space

core fiber-supplying means for supplying a stream of drawn core fibers to said twisting space,

drum-driving means for rotating said twisting drums in the same sense so that one of said twisting drums rotates at said twisting space toward the vertex thereof and said stream of core fibers is twisted in said twisting space,

covering fiber-supplying means for supplying said covering fibers to said twisting space so that said covering fibers are wound around said core fibers as the latter are twisted in said twisting space so as to form a covered yarn on a predetermined line of yarn formation, and

withdrawing means for withdrawing said covered yarn from one end of said twisting space,

the improvement residing in that

said core fiber-supplying means comprise a feed roller, which is adapted to receive on its circumference a drawn roving and is rotatable in a predetermined sense to move said drawn roving on said circumference toward said twisting space, roller-driving means for rotating said feed roller in said predetermined sense, and constraining means for subjecting said drawn roving on the circumference of said feed roller to a vacuum tending to hold said drawn roving on said circumference,

said apparatus also comprises

dividing means for dividing said roving on the circumference of said feed roller into first and second streams consisting of said core fibers and covering fibers, respectively,

said feed roller is rotatable in said predetermined sense to move said first stream on the circumference of said feed roller into said twisting space,

said constraining means are adapted to subject said first stream to said vacuum until said first stream is about to enter said twisting space, and

said core fiber-supplying means comprise means for detaching said covering fibers of said second stream from said feed roller and to cause said covering fibers to fly freely into said twisting space.

4,672,801

APPARATUS FOR PRODUCING TWO-COMPONENT THREAD

Aburakhim Abduganiev; Gennady V. Zhigalov, and Tatyana M. Batalkina, all of Tashkent, U.S.S.R., assignors to Tashkentskoe Spetsialnoe Konstruktorskoe Bjuro Textilnykh Mashin, Tashkent, U.S.S.R.

Filed Jan. 22, 1986, Ser. No. 821,458

Int. Cl.[4] D01H *13/16, 13/18*

U.S. Cl. 57—86 **5 Claims**

1. An apparatus for producing two-component thread, comprising:

a twisting member;

a bobbin with a supply of one component of the two-component thread;

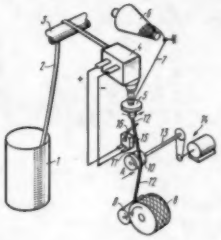
a holder for said bobbin;

means for feeding the other-component of said two-component thread into said twisting member;

a unit for winding said two-component thread into a package;

a holder for said package; means for rotating said holder for said package;

a device for severing one component of said two-component thread upon termination of the feed of the other component of the two-component thread, arranged intermediate said twisting member and said winding unit;



said device for severing said one component of said two-component thread including an element adapted to engage said two-component thread and having a slit of a width which is less than the thickness of said two-component thread and greater than the thickness of said one component of said two-component thread;

said element having said slit including a hollow cylinder wherein said slit is annular, said hollow cylinder having an internal space; drive means associated with said hollow cylinder; means for rotating said hollow cylinder;

at least one flat knife, said knife having a blade;

said at least one knife being accommodated in said internal space of said hollow cylinder;

said blade of said flat knife being situated in the zone adjoining said slit.

4,672,802

METHOD AND DEVICE FOR STARTING THE SPINNING OF A THREAD IN AN OE-SPINNING DEVICE

Hans Raasch, Monchen-Gladbach, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Monchen-Gladbach, Fed. Rep. of Germany

Filed Jul. 25, 1985, Ser. No. 759,425

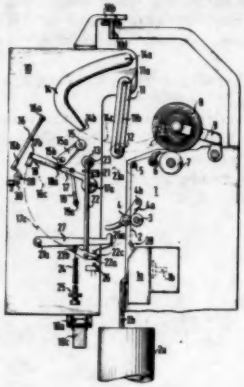
Claims priority, application Fed. Rep. of Germany, Jul. 25, 1984, 3427356

Int. Cl.[4] D01H *15/00*

U.S. Cl. 57—263 **10 Claims**

1. Method for starting the spinning of a thread in an OE-spinning device, which comprises bringing a thread end to a compressed gas current with a thread regulator before starting spinning, sucking in and holding the thread end and loosening fibers of the thread end with the compressed gas current for a limited period of time, subsequently removing the thread end

from the compressed gas current and conducting the thread end to a spinning element with the thread regulator, collecting



spinning fibers at the spinning element, and subsequently applying the spinning fibers to the thread end.

4,672,803

ARRANGEMENT FOR OPEN-END FRICTION SPINNING

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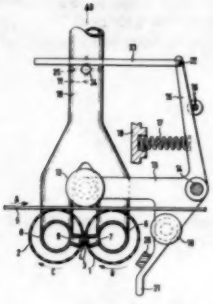
Filed Sep. 4, 1986, Ser. No. 903,774

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1985, 3531627

Int. Cl.[4] D01H *7/885*

U.S. Cl. 57—401 **11 Claims**



1. Apparatus for open-end friction spinning comprising:

a pair of adjacently arranged friction rollers forming a wedge-shaped yarn forming gap therebetween;

roller driving means for driving the rollers in the same rotational direction;

holding force means for applying holding forces to hold the forming yarn and supplied fibers in the wedge-shaped gap; and

separating means for separating the rollers from said roller driving means after yarn breakage, said separating means being controlled by a yarn monitor and including means insuring that the roller which normally rotates into the wedge-shaped gap during its deceleration has a rotational speed which at least at high rotational speeds does not exceed the speed of the other roller.

4,672,804

FRICTION SPINNING APPARATUS

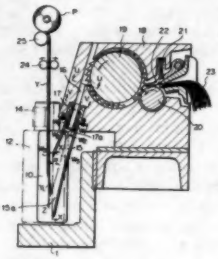
Meiji Anahara; Shigeru Muramatsu; Isamu Takagi, and Masayoshi Tuboi, all of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan

Filed Aug. 8, 1986, Ser. No. 894,649

Claims priority, application Japan, Aug. 10, 1985, 60-176266

Int. Cl.[4] D01H *7/885, 7/892*

U.S. Cl. 57—401 **4 Claims**



1. A friction spinning apparatus comprising a yarn formation surface,

fiber feed means for feeding discrete fibers to the surface, comprising a combing roller for opening a sliver to the individual discrete fibers,

fiber duct means for conveying the fibers from the fiber feed means to the yarn formation surface, a part of the periphery of the combing roller being exposed in the upper region of the fiber duct means,

surface moving means for moving the yarn formation surface in such a manner as to twist the discrete fibers conveyed thereto and deposited thereon to form a yarn thereby,

yarn withdrawal means for withdrawing the formed yarn from the surface in a direction transverse to the direction of movement of the surface, and

fiber suction means for providing an air stream within the duct means to suck the discrete fibers and move the same through the duct means from the fiber feed means to the yarn formation surface, characterized in that

the axis of the fiber duct means tangentially passing the exposed periphery of the combing roller and reaching the yarn formation surface intersects the axis of the yarn formed on and withdrawn from the yarn forming surface at an acute angle relative to the yarn withdrawing direction, and in that

the fiber duct means is formed as a nozzle means of a double pipe type, comprising concentric outer and inner pipes, in the midportion thereof, an exit of the inner pipe being directed to the yarn formation surface, a compressed air source being connected to an annular slit provided between the outer and inner pipes for ejecting an air stream in the direction of fiber transportation, whereby the fiber passing through the inner pipe is positively sucked out therefrom and advanced to the yarn formation surface in the stretched state.

4,672,805

GUIDE CHAIN FOR GUIDING ENERGY LINES

Werner Moritz, Siegen, Fed. Rep. of Germany, assignor to Kabelschlepp Gesellschaft mit beschränkter Haftung, Siegen, Fed. Rep. of Germany

Filed Feb. 21, 1986, Ser. No. 832,815

Claims priority, application Fed. Rep. of Germany, Mar. 1, 1985, 3507200

Int. Cl.[4] F16G *13/16*

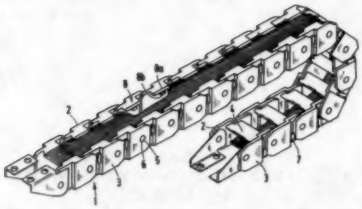
U.S. Cl. 59—78.1 **5 Claims**

1. A guide chain fo guiding energy lines longitudinally and

laterally thereof, with said guide chain being disposed between a fixed connection and a movable consuming device; said guide chain comprises:

a plurality of interconnectable chain link members, generally extending longitudally in the direction of movement of said mobable device, each link member is comprised of a one-piece, rigid, U-shaped receiving member having two legs that are connected by a crosspiece and that collectively therewith form an open sided chain link;

each of said legs of each chain link member is provided on one longitudnal end with pivot journals and on an opposite longitudinal end with pivot holes onto which the pivot journals of an adjacent link member engage to form the guide chain said guide chain having a predetermined two-way pivot angle of adjacent ones of said chain link members;



each of said legs of each said chain link member being provided adjacent said pivot journals a stop means to limit the two-way pivot angle of adjacent interconnected ones of said chain link members each comprised of two portions; said legs of a given chain link member having a first portion connected generally of a right angle to said crosspiece, and second portion extending outwardly from said first portion away from said crosspiece to a terminal end;

a respective holding element disposed at said terminal end of each of said links of a given chain link member; each of said holding elements projecting inwardly toward the other facing leg of that chain link member; and

a flexible cover strip that is retained between said holding elements in a self-supporting manner for covering the open side of each of said U-shaped receiving members of said chain link members.

4,672,806

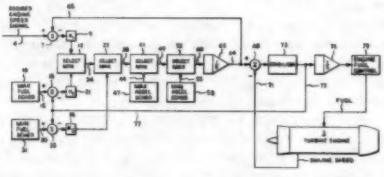
ISOCHRONOUS GAS TURBINE SPEED CONTROL

Alan D. Pisano, Chelsea, Mass., assignor to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 461,774, Jan. 28, 1983, Pat. No. 4,532,763. This application Apr. 11, 1985, Ser. No. 722,035

Int. Cl.⁴ F02C *9/28*

U.S. Cl. 60—39.03 **1 Claim**



1. Method of driving a controlled variable, which is indicave of the rate of fuel presently being delivered to a gas turbine ngine, to a desired value in response to an input signal, comrising the steps of:

(a) processing the input signal to produce a processed signal having a value within a predetermined range;

(b) generating a preliminary output signal having a time derivative substantially equal to the value of the processed signal;

(c) subtracting from the input signal a signal derived from the preliminary output signal;

(d) subtracting from the preliminary output signal a signal derived from the controlled variable;

(e) modifying the predetermined range of (a) in accordance with the subtracted preliminary output signal of (d);

(f) generating an output signal having a time derivative which is a function of the preliminary output signal after the subtraction of (d); and,

(g) modifying the controlled variable in accordance with the output signal.

4,672,807

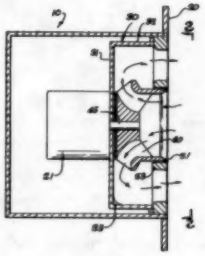
WALL THRUSTER AND METHOD OF OPERATION

Calvin A. Gongwer, Glendora, Calif., assignor to Innerspace Corporation, Glendora, Calif.

Continuation of Ser. No. 519,930, Aug. 3, 1983, abandoned. This application Jul. 2, 1985, Ser. No. 752,232

Int. Cl.⁴ B63H *11/08, 25/46*

U.S. Cl. 60—222 **5 Claims**



1. A wall thruster comprising an impeller of the mixed-flow type;

a driving means for rotating said impeller;

a swirl chamber comprising a cylinder and a backplate, wherein said backplate is attached to a first end of said cylinder and said impeller is rotatably mounted to said backplate coaxially with the axis of said cylinder;

a nozzle plate removably attached to a second end of said cylinder, the plane of said nozzle plate being substantially perpendicular to the axis of said cylinder, said nozzle plate comprising an intake port located in the center of said nozzle plate, and having a plurality of nozzles defined in said nozzle plate located around said intake port in the same plane, wherein the sides of said nozzles are substantially parallel to the centerline of said intake port, the outermost portion of said intake port and said nozzles being essentially flush with the outermost surface of said nozzle plate.

4,672,808

APPARATUS FOR THE REMOVAL OF COMBUSTIBLE SOLID PARTICLES FROM THE EXHAUST GASES OF INTERNAL COMBUSTION ENGINES

Rolf Leonhard, Schwieberdingen, and Hubert Dettling, Waiblingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jun. 11, 1986, Ser. No. 873,183

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1985, 3526074

Int. Cl.⁴ F01N *3/02, 3/26*

U.S. Cl. 60—286 **16 Claims**

1. Apparatus for the removal of combustible solid particles, especially soot, from exhaust gas from an internal combustion

engine, especially one having a separator system whereby an exhaust gas partial stream enriched with combustible solid particles is formed, comprising:

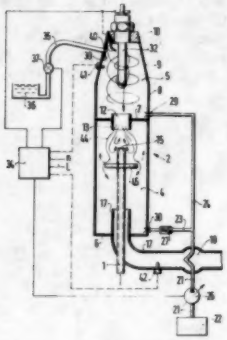
a combustion system with a cylindrical combustion chamber having a cylindrical wall, a first end wall and second end wall;

an injection pipe carrying a stream of exhaust gas from the internal combustion engine and extending into said combustion chamber from said first end wall thereof;

inlet means for supplying additional air and additional fuel;

an outlet for the combustion products of additional air, additional fuel, combustible solid particles and for exhaust gas;

a firing zone downstream from the issue of the solid particles from said injection pipe;



said means for supplying additional air and additional fuel including at least one additional-air line leading into said combustion chamber tangentially to said cylindrical wall of said combustion chamber, said injection pipe carrying the combustible solid particles discharging freely into said combustion chamber;

said outlet, over a portion of the length of said injection pipe, surrounding said injection pipe, said outlet comprising an exit tube leading out through said first end wall of said combustion chamber;

a flame transfer orifice for introducing the additional air and the additional fuel, said flame transfer orifice being in said second end wall of said combustion chamber and being situated coaxially with said injection pipe and having an upstream end; and

an ignition burner for forming a burning mixture adjoining said upstream end of said transfer orifice.

4,672,809

CATALYTIC CONVERTER FOR A DIESEL ENGINE

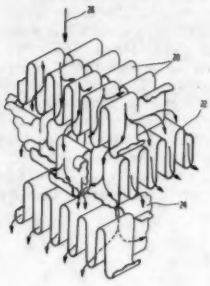
Richard C. Cornelison, 6587 Rte. 82, Hiram, Ohio 44234, and William B. Retallick, 1432 Johnny's Way, West Chester, Pa. 19382

Continuation-in-part of Ser. No. 648,381, Sep. 7, 1984, Pat. No. 4,597,262. This application May 5, 1986, Ser. No. 859,438

Int. Cl.[4] F01N *3/02, 3/28*

U.S. Cl. 60—286 **32 Claims**

1. A catalytic converter for a diesel engine comprising at least one metal strip, the strip being formed into an undulating series of U-bends, the series comprising U-bends that are open on top and U-bends that are closed on top, the open and closed U-bends alternating in a checkerboard pattern, the strip being aligned generally transversely to the direction of flow of exhaust gas from the engine, the strip defining a tortuous flow



path for exhaust gas from the engine, the strip being coated with a combustion catalyst.

4,672,810

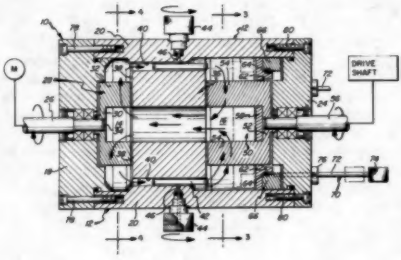
HYDRAULIC TRANSMISSION DEVICE AND METHOD OF USING IT

Christian P. Marlowe, 6491 Magnolia Ave., Nederland, Colo. 80466

Filed Oct. 15, 1985, Ser. No. 787,251

Int. Cl.[4] F16D *33/02*

U.S. Cl. 60—332 **23 Claims**



1. A fluid-operated transmission device comprising:

a housing enclosing an input chamber and an output chamber, the latter having an unbaffled portion thereof provided by an adjustable baffle means movably mounted within the output chamber, the input chamber and the unbaffled portion of the output chamber being interconnected in fluid flow communication by a fluid discharge passage and a fluid return passage to define a fluid flow circuit;

an impeller mounted for rotation within the input chamber and having input connector means dimensioned and configured for connection to a driving means for rotation of the impeller by such driving means to pump fluid through the discharge passage; and

a variable-speed rotor mounted for rotation within the output chamber by fluid discharged from the discharge passage and having output connector means dimensioned and configured for connection to a driven means for driving thereof by the rotor, the rotor comprising a rotor impingement surface disposed in the unbaffled portion of the output chamber and defined by a plurality of rotor blades open to radial flow in the fluid flow circuit over substantially all of the impingement surface, whereby positioning of the adjustable baffle means to adjust the volume of the unbaffled portion of the output chamber adjusts the rota-

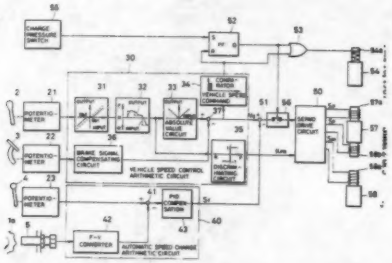
tional speed of the rotor by varying the velocity of fluid flow in the unbaffled portion of the output chamber.

4,672,811

VEHICLE SPEED CONTROL SYSTEM

Daisuke Yoshida; Tomiya Tanno, both of Hiratsuka, and Takeshi Fukunaga, Isehara, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakubsho, Tokyo, Japan

Filed Apr. 17, 1984, Ser. No. 601,228
Int. Cl.[4] B60K *41/20, 41/16*
U.S. Cl. 60—449 **7 Claims**



1. A vehicle speed control system for performing vehicle speed control by controlling the displacement of at least one of a hydraulic pump and a hydraulic motor of a hydraulic transmission through an electric servo device, comprising:

vehicle speed setting means for generating a voltage signal corresponding to a vehicle speed to be set;

compensating means interposed between said vehicle speed setting means and said electric servo device, said compensating means comprising a first delay element and a second delay element having a response characteristic slower than that of said first delay element; and

selecting means for judging as to whether a voltage signal changed by the operation of said vehicle speed setting means represents an acceleration command or a deceleration command and for selecting said first delay element when said voltage signal represents an acceleration command and for selecting said second delay element when said voltage signal represents a deceleration command.

4,672,812

BRAKING BOOSTER SERVOMOTOR OF LIGHTENED STRUCTURE

Jean-Jacques Carre, Leraincy, France, assignor to Societe Anonyme D.B.A., Paris, France

Continuation-in-part of Ser. No. 235,282, Feb. 17, 1981, abandoned. This application Nov. 15, 1982, Ser. No. 441,716
Claims priority, application France, Feb. 22, 1980, 80 03951
Int. Cl.[4] B60T *13/00*
U.S. Cl. 60—547.1 **10 Claims**

1. A brake booster servomotor located between an actuation member and a master cylinder, comprising:

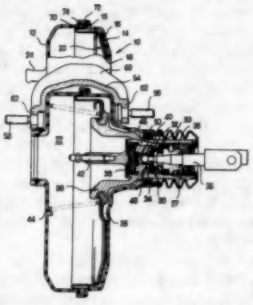
a first shell having a first end plate with a substantially cylindrical body extending therefrom, said first cylindrical body having a first peripheral surface thereon;

a second shell having a second end plate with a substantially cylindrical body extending therefrom, said second cylindrical body having a second peripheral surface thereon, said first and second peripheral surfaces being connected to define a substantially cylindrical casing;

said casing having at least one depression extending substantially radially from the cylindrical body;

a movable assembly forming a drive piston which divides said casing into two pressure chambers; and

a rigid substantially U-shaped stirrup member having first and second arm portions provided with fixing means, said stirrup member being forcibly mounted in said depression with said first arm in contact engagement with said first end plate and said second arm in contact engagement with said second end plate to contribute to the closure of said casing, said stirrup member transferring reaction forces directly from the master cylinder to the actuation member



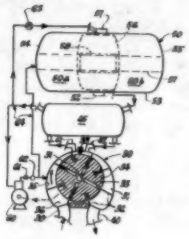
without effecting the connection between the first and second cylindrical body.

4,672,813

EXTERNAL COMBUSTION SLIDABLE VANE MOTOR WITH AIR CUSHIONS

Constant V. David, 4952 Field St., San Diego, Calif. 92110

Continuation-in-part of Ser. No. 789,451, Oct. 21, 1985, Pat. No. 4,653,274, which is a continuation-in-part of Ser. No. 586,812, Mar. 6, 1984, Pat. No. 4,561,252. This application May 27, 1986, Ser. No. 866,945
Int. Cl.[4] F02B *71/04*
U.S. Cl. 60—595 **13 Claims**



1. In combination:

an external combustion sliding-vane engine comprising a motor member including means for compressing ambient air and means for expanding the combusted gas resulting from the combustion of fuel in the compressed air,

a combustion member for receiving compressed air from the motor member, mixing the fuel with compressed air, igniting the mixture and burning the fuel, and delivering the combusted gas to said motor member, and

a shaft connecting the compressing and expanding means for delivering power by means of an external drive shaft,

the motor member further including a plurality of generally cylindrical center bodies, a plurality of generally cylindrical hollow external structures surrounding and enclosing corresponding ones of the center bodies, a plurality of flanges supporting the center bodies and hollow external structures for relative rotation therebetween about the shaft axis, each center body and corresponding hollow external structure being positioned between a corresponding pair of adjacent flanges, the external hollow structures and the center bodies having continuously curved surfaces positoned to face each other, a plurality of radially extending vane means extending between each pair of adjacent flanges at a plurality of circumferentially spaced locations, each vane means extending from an outer facing surface of a corresponding center body to an inner facing surface of

a corresponding external hollow structure to thereby define a plurality of substantially circumferentially spaced sealed spaces between the flanges and the circumferential facing surfaces, each of the vane means being slidable in a substantially radial direction with respect to its corresponding facing surfaces, the curvatures and relative positions of the facing surfaces being such that a first portion of the sealed spaces progressively decrease in volume and a second porion of said sealed spaces progressively increase in volume as relative rotation of the facing surfaces takes place, an air inlet at the location where the decreasing volume is largest, an air outlet at the location where the decreasing volume is smallest, a combusted gas inlet at the location where the increasing volume is smallest and a combusted gas outlet at the location where the increasing volume is largest,

a length of a first portion of each vane means which is located between its corresponding facing surfaces varying and a second portion of the vane means being guided laterally in a sliding motion between a pair of opposing walls of a guiding and structurally restraining slot-shaped housing.

the guided laterally restrained first portion of each vane means and the center bodies being supported between the corresponding guiding surfaces by pressurized air cushion means; and

a plurality of air cushions located between all sliding surfaces formed by the relative motions of the center bodies, the external structures, the vane means and the shaft each air cushion being formed in a shallow cavity positioned between two closely located contiguous sliding surfaces, said cavity being defined by a first sliding surface on one side and a generally matchingly-shaped second surface on the other side, the first and second surfaces being generally parallel, the second surface being surrounded by a third narrow surface substantially orthogonal to the first and second surfaces and extending around the perimeter of the second surface and rising to a fourth surface generally parallel to the first surface and forming the other associated cooperating sliding surface, the supporting means so provided by said plurality of air cushions further including:

means for supplying and ducting presurized air to each of the shallow cavities,

a fixed size restricting orifice positioned in the ducting means between the air supplying means and each shallow cavity,

means for enabling the presssurized air to leave each air cushion between its corresponding two sliding surfaces for venting into the corresponding sealed spaces, and

means for enabling two cooperating air cushions to operate in opposition against two of the first surfaces, said surfaces being fixed and separated by a fixed distance, the air cushions being housed in a structural member to be guided by and restrained between said two first surfaces in its sliding motion, said structure extending between two of the fourth surfaces separated by a distance slightly smaller than the distance separating the two first surfaces, so as to form two gap openings, each one gap being positioned between associated cooperating first and fourth sliding surfaces, one gap opening becoming automatically larger when the other gap opening becomes smaller and vice-versa,

whereby each gap opening created by the distance separating each pair of cooperating sliding surfaces along a perimeter of the corresponding cavity forms a variable area restricting orifice, thereby enabling the pressure inside the cavity to vary according to said distance between the two sliding surfaces, and

whereby a guided and restrained structural member equipped with air cushions becomes automatically centered and is maintained in said centered position between the two guiding and restraining first surfaces.

4,672,814

METHOD AND APPARATUS FOR CONTROLLING SUPERCHARGE PRESSURE FOR A TURBOCHARGER

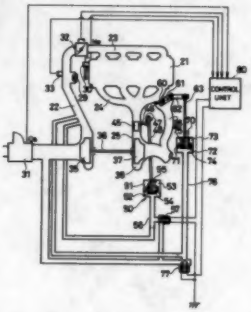
Toshimi Abo, Yokohama, and Takashi Ueno, Yokosuka, both of Japan, assignors to Nissan Motor Co., Ltd., Kanagawa, Japan

Filed Aug. 26, 1985, Ser. No. 769,503

Claims priority, application Japan, Aug. 28, 1984, 59-178586

Int. Cl.[4] F02B *37/12*

U.S. Cl. 60—602 **10 Claims**



1. A method for controlling supercharge pressure of a turbocharger, which comprises the steps of:

(a) seeking a basic control amount, BASE, from a look-up table in accordance with an intake air flow rate Qa;

(b) determining if an actual supercharge pressure P2 detected is greater than a first predetermined value of supercharge pressure;

(c) calculating the deviation ΔP between the first predetermined supercharge pressure and the actual supercharge pressure P2, and also calculating a proportional value portion (PROP=K1×ΔP) where K1 is a first constant;

(d) determining if the actual supercharge pressure P2 is greater than a second predetermined value of supercharge pressure;

(e) calculating an integral value portion INT=(K2×ΔP+INT') when the actual supercharge pressure P2 is greater than the second predetermined value where K2 is a second constant and INT' is a value of INT resulting from a prior calculation, and setting INT to be zero when the actual supercharge pressure P2 is not greater than the second predetermined pressure;

(f) calculating a duty value OUT which is a sum of BASE, PROP and INT; and

(g) actuating an electromagnetic valve for controlling the supercharge pressure in accordance with the duty value OUT.

4,672,815

Patent Not Issued For This Number

4,672,816

COOLING SYSTEM WITH DEVICE FOR PREVENTING A BAD ODOR FROM CIRCULATING

Tadahiro Takahashi, Konan, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Aug. 22, 1985, Ser. No. 768,231

Claims priority, application Japan, Aug. 24, 1984, 59-128459[U]

Int. Cl.[4] F25D *17/00*

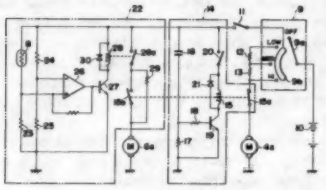
U.S. Cl. 62—180 **4 Claims**

1. A cooling system including a refrigeration cycle having a

compressor and an evaporator, and a blower for supplying air to said evaporator of said refrigeration cycle, comprising:

(a) a means for adjusting for the capacity of said compressor, said compressor having a maximum capacity and a lower normal capacity;

(b) a means for stopping said blower until said evaporator is substantially dewed after the start of said compressor;



(c) a means for driving the compressor to maximize the capacity of said compressor under the action of said capacity adjusting means until the stoppage of said blower is nullified under the action of said blower stopping means; and

(d) a synchronizing means for synchronizing the starting of said blower with the changing of said compressor capacity by said capacity adjusting means from its maximum capacity to its normal capacity.

4,672,817

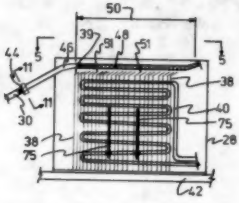
AIR CONDITIONING COOLING DEVICE

Frank D. Croce, 2105 Sherwood Ave., Monroe, La. 71201

Filed Feb. 6, 1985, Ser. No. 698,838

Int. Cl.[4] F25B *39/04*

U.S. Cl. 62—183 **5 Claims**



1. A method of cooling an air conditioner condenser having a coil, the condenser coil having an upper surface comprising the steps of:

(a) providing a predetermined length of tubing having an inner diameter, an external diameter, an upper surface and a lower surface, and a plurality of radially spaced apart holes positioned on the tubing;

(b) attaching the tubing to the upper surface of the condenser coil;

(c) providing a wick having an internal diameter;

(d) positioning the wick over the tubing such that each of the plurality of spaced apart holes is covered;

(e) providing a supply of water; and

(f) flowing water through the inner diameter of the tubing such that the water flows out of the plurality of holes and is wicked along the length of the lower surface of the tubing until the wick is saturated and as the water flows out of the plurality of holes, the wick serves to divert the water from the upper surface of the tubing and the water moves by gravity to the lower surface of the tubing and downwardly over the condenser coil thereby preventing the water from moving upwardly or outwardly in an uncontrolled manner in parts of the air conditioner other than the condenser coil.

4,672,818

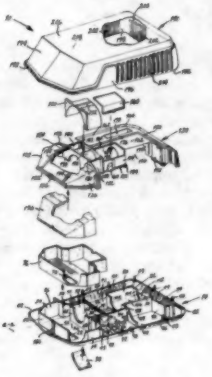
THREE-MEMBER PLASTIC ROOFTOP AIR CONDITIONER HOUSING

James E. Roth, Desoto, Mo., assignor to Intertherm Inc., St. Louis, Mo.

Filed Sep. 8, 1986, Ser. No. 904,415

Int. Cl.[4] B60H *1/32*

U.S. Cl. 62—239 **16 Claims**



1. A three-member molded plastic housing for a rooftop air conditioning unit, comprising

(I) a molded plastic base member including base opening means to receive return air to such unit, and to discharge conditioned air therefrom, and to receive wiring from beneath such roof, and

means to provide lower half-walls for an evaporator compartment, an evaporator blower compartment, and a condenser compartment separator dividing its area into an inlet chamber side and an outlet plenum side, and means to provide lower half-walls for a motor compartment and a condenser blower compartment on said inlet chamber side,

(II) a molded plastic intermediate member having means to provide upper half-walls completing those lower half-wall elements recited in (I) hereinabove, and including means to provide a condenser blower compartment window across the condenser compartment separator, further having

means to provide a roof for the evaporator and condenser compartments and a ridge extending aft of said evaporator compartment roof to an outer margin of said base member, in combination with

(III) an upper shroud member having means to communicate inlet air to such inlet chamber side and to permit exit of air from the outlet plenum side of such condenser area compartment, together with

sealing means, along said intermediate member ridge and between it and the undersurface of said shroud, to prevent recirculation within said shroud of air from such plenum side to such inlet side.

4,672,819
COOLING UNIT

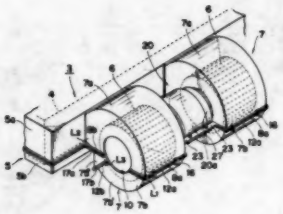
Kaoru Mino, and Yoshikazu Yanagisawa, both of Konan, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Aug. 26, 1986, Ser. No. 900,625

Claims priority, application Japan, Aug. 29, 1985, 60-132046[U]

Int. Cl.[4] F25D *17/06*

U.S. Cl. 62—298 **5 Claims**



1. A cooling unit for an automobile air conditioner adapted to be mounted on the ceiling of a vehicle, comprising:

(a) a cooling case having an upper case member and a lower case member;

(b) a blower case having an upper case member and a lower case member, said upper blower case member being integral with said upper cooling case member;

(c) said lower blower case member including a removable portion and a fixed neck portion integral with said lower cooling case member, said removable portion being detachably connected by fastener means to said upper blower case member and said fixed neck portion; and

(d) a bracket for holding thereon a blower motor, said bracket including a bracket body joined with said upper cooling case member, and a retaining member detachably connected to said bracket body to support the motor from below.

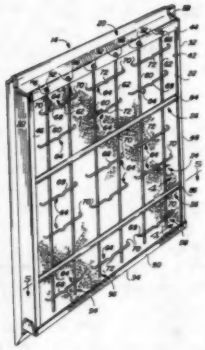
4,672,820
EVAPORATIVE COOLER PAD ASSEMBLY

Adam D. Goetti, 4960 E. Palomino Dr., Phoenix, Ariz. 85018

Filed Mar. 17, 1986, Ser. No. 840,191

Int. Cl.[4] F28D *5/00*

U.S. Cl. 62—304 **22 Claims**



1. A cooler pad assembly for use in an evaporative cooler comprising in combination:

(a) a frame structure including a top frame member, a bottom frame member and an opposed pair of side frame members, said top, bottom and pair of side frame members cooperatively defining an air passage having a planar air inlet face and an open air outlet face and each having a flange which cooperatively surround the open air outlet face of said frame structure;

(b) a wettable pad medium in the air passage of said frame structure;

(c) grill means demountably connected to the flange of said top frame member so as to depend therefrom toward said bottom frame member, said grill means lying substantially in the plane of the open air outlet face of said frame structure and in engagement with said wettable pad medium to demountably retain said pad medium in the air passage defined by said frame structure, said grill means is configured to be in spaced non-engaging relationship with respect to the bottom and opposed side frame members of said frame structure; and

(d) retainer means in engagement with said grill means, said retainer means having opposite ends which are in demountable engagement with said side frame members of said frame structure to demountably hold said grill means in engagement with said pad means.

4,672,821
ABSORPTION-TYPE HEAT PUMP

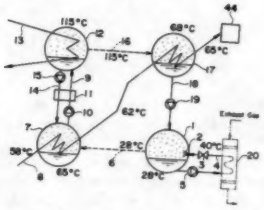
Masaharu Furutera, Maizuru; Tetsuro Furukawa, Suita; Yoshiaki Matsushita, Maizuru, and Kenji Nakauchi, Hirakata, all of Japan, assignors to Hitachi Zosen Corporation, Osaka, Japan

Filed Nov. 21, 1985, Ser. No. 800,540

Claims priority, application Japan, Nov. 24, 1984, 59-248387; Jun. 28, 1985, 60-143216

Int. Cl.[4] F25B *13/00*

U.S. Cl. 62—324.2 **11 Claims**

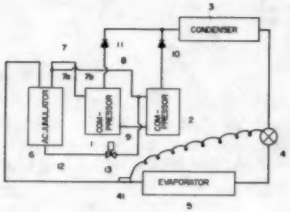


1. An absorption-type heat pump comprising an evaporating unit for flash-evaporating a refrigerant supplied thereinto, an absorbing unit in which the refrigerant vapor received from the evaporating unit is absorbed into a liquid absorbent with the generation of heat to heat a heat carrier fluid, a regenerating unit for concentrating the diluted absorbent received from the absorbing unit by heating same with a heating fluid to evaporate the refrigerant content thereof so that the absorbent is reused in the absorbing unit, and a condensing unit condensing the refrigerant vapor received thereinto from the regenerating unit, the liquid phase refrigerant collected in the evaporating unit from the condensing unit being passed through a closed passage to the evaporating unit for repeated flash evaporation, the closed passage heating the liquid phase refrigerant in heat exchange.

4,672,822
REFRIGERATING CYCLE APPARATUS

Hitoshi Iijima, Amagasaki, and Hiroaki Hama, Wakayama, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 17, 1985, Ser. No. 809,798
Claims priority, application Japan, Dec. 18, 1984, 59-266595
Int. Cl.[4] F25B *43/02*
U.S. Cl. 62—468 **5 Claims**



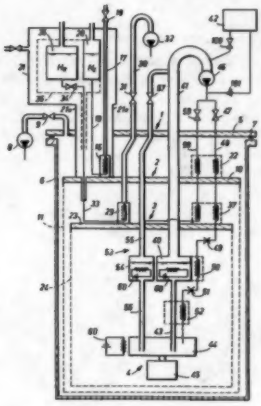
1. A refrigerating cycle apparatus, comprising:
a condenser and an evaporator;
first and second compressors connected with each other by an equalizer pipe for equalizing an internal oil amount in a shell of each of said first and second compressors; and
a suction pipe for said first compressor being connected to a low pressure pipe at the outlet side of said evaporator, and a suction pipe for said second compressor being branched from said suction pipe for said first compressor;
said suction pipe for said first compressor having a riser piping through which a refrigerant rises and said suction pipe for said second compressor is connected to said riser piping; and
a by-pass pipe provided connecting the upstream side of said riser piping to said suction pipe for said second compressor; and
a stop valve interposed within said by-pass pipe.

4,672,823
DILUTION CRYOSTAT

Alain D. Benoit, Eybens, and Serge Pujol, Poisat, both of France, assignors to Centre National de la Recherche Scientifique, Paris, France

Filed Dec. 13, 1985, Ser. No. 808,880
Claims priority, application France, Dec. 17, 1984, 84 19448
Int. Cl.[4] F25B *19/00*
U.S. Cl. 62—514 R **16 Claims**

1. A dilution cryostat, comprising:
a dilution chamber;
a principal evaporator located above said dilution chamber and having an inlet and an outlet, the inlet of said principal evaporator being connected to said dilution chamber by tubing;
a principal pumping circuit, further comprising:
a pump having an inlet and an outlet; and
tubing connecting the outlet of said principal evaporator and the inlet of said pump;
a principal cryogenic media delivery circuit, further comprising:
means for liquifying cryogenic gas and delivering the resulting liquid to said dilution chamber;
a secondary pumping circuit, further comprising:
a secondary evaporator located above said dilution chamber and having an inlet and an outlet, the inlet of said secondary evaporator being connected to said dilution chamber by tubing;
tubing connecting the outlet of said secondary evaporator to the tubing of said principal pumping circuit;
a valve, located in said secondary pumping circuit tubing, between said secondary evaporator and the tubing of said principal pumping circuit;
a secondary cryogenic media delivery circuit, further comprising:
means for cooling cryogenic gas and delivering the resulting cooled gas to the tubing of said secondary pumping circuit, between said secondary evaporator and the valve of said secondary pumping circuit;

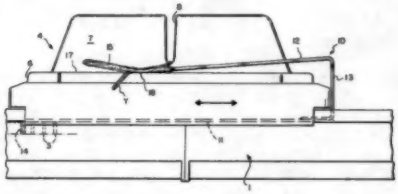


valve means, connecting the outlet of said pump with the principal and the secondary cryogenic media delivery circuits, for directing the output of said pump to either said principal delivery circuit or said secondary delivery circuit;
an inner container enclosing said dilution chamber and said principal and secondary evaporators;
means for cooling said inner container;
a second container, enclosing said inner container; and
means for cooling said second container.

4,672,824
FLAT BED KNITTING MACHINES

Roger F. N. Curry, Little Egypt, The Playing Close, Charlbury, Oxford, United Kingdom

PCT No. PCT/GB85/00554, § 371 Date Aug. 1, 1986, § 102(e) Date Aug. 1, 1986, PCT Pub. No. WO86/03524, PCT Pub. Date Jun. 19, 1986
PCT Filed Dec. 6, 1985, Ser. No. 902,367
Claims priority, application United Kingdom, Dec. 6, 1984, 8430775; Mar. 8, 1985, 8508995
Int. Cl.[4] D04B *15/44*
U.S. Cl. 66—146 **10 Claims**



1. A yarn restraining device (10) for positioning on a flat-bed knitting machine of the type described at or adjacent one end of the stroke of the cam box (4), said device being characterised by a spring arm (12) for engaging with a cooperating

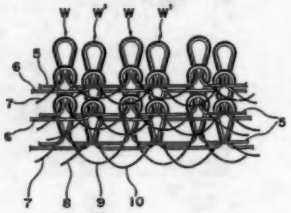
surface (17) of the cam box during movement thereof over a predetermined end portion of its stroke and for trapping the yarn (Y) between itself and said surface (17), said arm (12) being adapted to retain the yarn so trapped as the cam box commences a reverse stroke and until the yarn is re-engaged by the cam box with the adjacent end working needle (2), whereby to take up slack in the yarn produced at the end of a cam box stroke and avoid the formation of loops between the rows of stitches.

4,672,825

ANTISTATIC COVER

Akio Yasukawa, Higashiosaka, and Yoshihiro Misuna, Osaka, both of Japan, assignors to Katsura Roller Mfg. Co., Ltd., Japan

Filed Dec. 6, 1985, Ser. No. 806,231
Claims priority, application Japan, Dec. 6, 1984, 59-185645[U]; Dec. 6, 1984, 59-185646[U]
Int. Cl.[4] D04B 7/12, 7/16
U.S. Cl. 66—194 **4 Claims**



1. A tubular knitted fabric antistatic cover comprising two shrinkable ground yarns, said tubular knitted fabric having a tubular double plain knitted fabric structure wherein said two ground yarns are each alternatively knitted so that needle loops in each course of a ground fabric are alternately formed by said respective two ground yarns to form sinker loops each having a width longer than that of the corresponding needle loop in each said course of said ground fabric, and further wherein said ground yarns are selected from the group consisting of water-shrinkable yarns and heat-shrinkable yarns, at least one of said ground yarns containing fibers selected from the group consisting of charge control fibers and electrically conductive fibers, said tubular fabric having a radial shrinking percentage of generally between about 20 to 25% and an axial shrinking percentage of generally between about 25 to 30%.

4,672,826

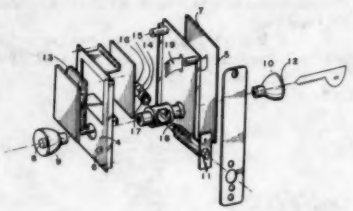
ELECTROMECHANICAL LOCK ACTUABLE SIMULTANEOUSLY BY SEVERAL PROGRAMMABLE CODES, BY ONE OR MORE USERS AND WHOSE ECCENTRIC FOR UNLOCKING THE BOLT IS ECCENTRICALLY MOUNTED DIRECTLY ON THE MOTOR SHAFT

Paul Mombelli, Nice, France, assignor to MER/I.C.B., Sartrouville, France

Filed Feb. 14, 1986, Ser. No. 829,609
Claims priority, application France, Feb. 14, 1985, 85 02387
Int. Cl.[4] E05B 49/00
U.S. Cl. 70—278 **4 Claims**

1. Electromechanical lock with coded keyboard comprising, on its interior face, a pushbutton (6) which permits programming the secret code of the user for passage and the secret code or codes for service and, on its exterior face (5), a coded keyboard (7), said lock comprising in addition to buttons corresponding to the normal buttons of a keyboard (7) at least specific button (20, 21) controlled to open the door (3) after having composed the program and/or for programming secret codes for service

the electric unlocking of the lock using means (17) making use of an eccentric, actuated by an electric motor (16), which acts on a trigger (18) for unlocking, and



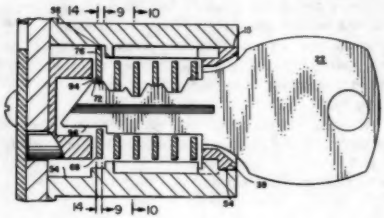
the eccentric (17) is a disk mounted eccentrically on the shaft (15) of the electric motor (16); the rotation of the said shaft (15) causing the disk to turn, which, under the action of centrifugal force, strikes the trigger (18) to free a bolt.

4,672,827

DISC TUMBLER LOCK WITH REMOVABLE PLUG

Clark E. Craig, Simpsonville, S.C., assignor to Keycon Hardware Products, Inc., Mauldin, S.C.

Filed Nov. 8, 1984, Ser. No. 669,538
Int. Cl.[4] E05B 29/02
U.S. Cl. 70—367 **3 Claims**



1. A cylinder lock with a key operated removable plug comprising, in combination:

a first key means for operating the cylinder lock;

a second key means for allowing removal of the plug;

a cylinder having a longitudinal axis and defining a cylindrical passage of substantially constant diameter;

an outwardly extending circumferential flange at one end of the passage, a longitudinal groove in the inside surface of the passage through the flange to the front end of the passage;

a plug rotatable mounted for rotation about the longitudinal axis in the cylinder passage, said plug having an outside diameter substantially equal to the diameter of the cylinder passage and rotatably mounted in the cylinder passage, said plug including front face plate means of greater diameter than the plug to limit translation of the plug in the cylinder from the front of the passage, said plug including a plurality of tumbler passages generally transverse to the longitudinal axis, an associated key slot mateable with the first and second key means and interconnecting the tumbler passages, and a control tumbler passage mateable with the first and second key means, said control tumbler passage positioned at least in part longitudinally spaced from the front face plate means and beyond the circumferential cylinder flange when the plug is in the cylinder;

a plurality of combinated tumblers in the tumbler passage configured to engage both the first and second key means, each tumbler defining a dimension transverse to the longitudinal axis no greater than the passage diameter, biasing

means for the tumblers in each passage, to bias the combinated tumblers beyond the plug diameter to engage the cylinder and prevent plug rotation, said tumblers being translated agaist the force of the biasing means by either the first key means or the second key means to align the tumblers within the diameter of the plug whereby the plug may be rotated;

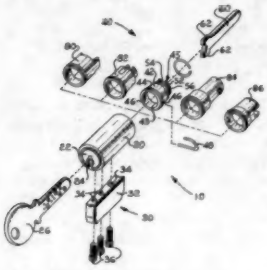
a control tumbler disc in the control tumbler passage configured to engage both the first and second key means, said control tumbler disc defining a transverse dimension greater than the cylinder passage diameter, said control tumbler disc defining unbiased means engaging the flange and preventing movement of the plug in a longitudinal direction out of the cylinder (1) during rotation of the plug when the first key means is placed in key slot and engages the control tumbler; and (2) during non-rotation of the plug when no key means is in the key slot, said control tumbler disc also defining unbiased means disengageable from the flange to release the plug when the second key means is engaged with all the tumblers to align the combinated tumblers within the diameter of the plug and the control tumbler disc is translated to extend one end into the longitudinal groove, said one end shaped to slide in the longitudinal groove, the opposite end being oversized relative to the groove.

4,672,828

KEY-IN-KNOB CYLINDER REPLACEMENT SYSTEM

Kenneth T. Theriault, Cheshire, Conn., assignor to Lori Corporation, Southington, Conn.

Filed Jan. 12, 1984, Ser. No. 570,220
Int. Cl.[4] E05B *9/04*
U.S. Cl. 70—373 **18 Claims**



1. A replacement assembly for a lock cylinder of the type including a generally cylindrical body and a plug having a keyway, the plug being rotatable relative to said body upon insertion of the proper key into the keyway, the lock cylinder also including a pin housing projecting from the cylindrical body and means located within and partly extending from the pin housing for preventing rotation of the plug relative to the cylindrical body, the lock cylinder further including an actuation means for actuating a latch assembly in response to relative rotation between the cylindrical body and the plug, said replacement assembly comprising:

a generally cylindrical shell, said shell having an outer diameter generally commensurate with the diameter of the cylindrical body of the cylinder to be replaced;

plug means defining a keyway, said plug means being rotatable relative to said shell upon insertion of the proper key into the keyway, said plug means housing the means which prevents rotation of said plug means in the absence of the proper key;

a removable false bible, said false bible having a size and a shape substantially equal respectively to the size and shape of the pin housing of the lock cylinder to be replaced;

mounting means for removably affixing said false bible to said shell; and

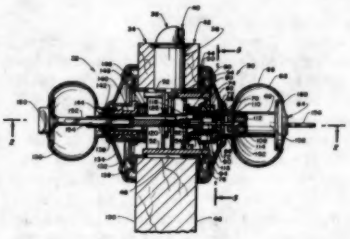
adaptor means for actuating a latch assembly in response to rotation of said plug means relative to said shell, said adaptor means being secured to said plug means.

4,672,829

DOORLATCH KNOB ASSEMBLY HAVING FRONT END LOADING

Arnold C. Gater, Anaheim, and Thomas S. S. Hu, Corona, both of Calif., assignors to Kwikset Corporation, Anaheim, Calif.

Division of Ser. No. 652,209, Sep. 20, 1984, Pat. No. 4,631,944. This application Nov. 29, 1985, Ser. No. 802,681
Int. Cl.[4] E05B *13/10*
U.S. Cl. 70—472 **6 Claims**



1. In a latch construction of the type for mounting in doors and the like having a latch mechanism mounted within the door operably connected to at least an exterior operator retracted positions projecting from a door edge; the improvements including: said lock being of the type unitarily insertable for use axially into and removable for replacement from said exterior operator; said lock having a cylinder rotatably mounting a plug; securement means on said lock axially inward of said cylinder axially abutting said cylinder and rotatable exactly with said plug, said securement means preventing outward axial movement of said plug relative to said cylinder, said plug and securement means being rotatable between a lock non-secured position and a lock secured position; engagement means on said exterior operator disengaged from said securement means when said securement means is in said non-secured position and outwardly axially engaged with said securement means holding said lock in operable position when said securement means is engaged with said engagement means and moved to said lock secured position; a key in said lock plug turnable to certain positions for rotating said plug to rotate said securement means said securement means comprising a C-shaped retaining collar with an opening therein secured on said lock plug at an inner end of said cylinder rotatable with said lock plug for movement between said lock non-secured and lock secured position; and in which said lock cylinder has a recess formed therein opening outwardly at said lock cylinder inner end, said C-shaped retaining collar having said opening movable with said lock plug to said recess in said lock non-secured position and away from said recess to said lock secured position.

4,672,830

METHOD OF CONTROLLING AN EDGING OPENING IN A ROLLING MILL

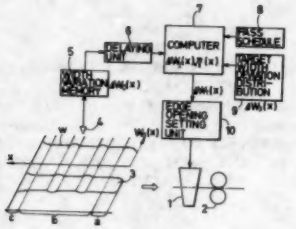
Hidehiko Tsukamoto; Eiji Kohmoto, both of Hiroshima; Koichi Asada, deceased, late of Kur (by Kuniko Asada, legal representative); Masakuni Yamasaki, Kure; Kenichi Matsumoto, Kure; Euji Nakazono, Kure; Yoshinori Wakamiya, Kobe, and Satoru Kuramoto, Kobe, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha and Mitsubishi Denki Kabushiki Kaisha, both of Tokyo, Japan

Filed May 30, 1985, Ser. No. 739,390

Claims priority, application Japan, May 30, 1984, 59-108433

Int. Cl.[4] B21B *37/00*

U.S. Cl. 72—8 **2 Claims**



1. A method of controlling an edging opening in a rolling mill including an edging roll having an inlet and a feedforward control for controlling the edging opening followed by a horizontal roll and then by a succeeding rolling process for finishing, comprising the steps of

(i) measuring a width distribution $W_0(X)$ along the full length of a material to be rolled having a leading end part, a trailing end part and an intermediate part extending between the leading end and a trailing end part and effecting the measuring adjacent to and upstream from the inlet of the edging roll from the leading end to the trailing end,

(ii) calculating an optimum edging opening variation quantity distribution $\Delta W_1(x)$ from a predetermined pass schedule, a target width deviation distribution $\Delta W_3(x)$ of the rolled material required at an outlet of the rolling mill and the width distribution $W_0(x)$ of the rolled material measured at the inlet of the edging roll, and

(iii) supplying the optimum edging opening variation quantity distribution to an edging opening setting unit for the feedforward control,

said pass schedule for calculating the optimum edging opening variation quantity distribution $\Delta W_1(x)$ includes a target plate width value W_0 at the inlet, an edging opening setting value W_1, a plate width W_2 on the supposition that only dogbones or swelling at the ends of the plate produced in the edging rolling process are horizontally rolled, and a plate width W_3 after horizontal rolling,

said step of calculating said optimum edging opening variation quantity distribution $\Delta W_3(x)$ comprises steps of:

calculating a width deviation distribution in a moving direction of the plate at an irregular deformation portion produced in the rolling process and a corresponding length of the plate in the moving direction,

calculating a plate width adjustment efficiency on the basis of the calculated values of the width deviation distribution and the length of the plate in the moving direction, and

calculating an optimum edging opening variation distribution using the plate width adjustment efficiency,

said step of calculating the width deviation distribution in the moving direction of the plate at the irregular deformation portion produced in the rolling process includes the following calculations:

when edging rolling and dogbone rolling are carried out, a width deviation $\Delta W_{T\cdot V}$ produced at the leading edge of the plate and a width deviation $\Delta W_{B\cdot V}$ produced at the trailing edge of the plate are given by

$$\Delta W_{T,V} = K_{T2} \cdot \left\{ 1 - \frac{C_T}{3 + \dfrac{(W_0 - W_1)}{t_0}} \right\} \cdot L_T + \Delta B_E \tag{1}$$

$$\Delta W_{B,V} = K_{B2} \cdot \left\{ 1 - \frac{C_B}{3 + \dfrac{(W_0 - W_1)}{t_0}} \right\} \cdot L_B + \Delta B_E \tag{2}$$

when horizontal rolling is carried out, a width deviation distribution $\Delta W_{T\cdot H}(x)$ produced at the leading edge of the plate and a width deviation distribution $\Delta W_{B\cdot H}(x)$ produced at the trailing edge of the plate are given by

$$\Delta W_{T,H}(x) = K_{T3} \cdot \left(1 - \frac{x}{l_T} \right)^{\zeta} \cdot g(r_H) \tag{3}$$

$$\Delta W_{B,H}(x) = K_{B4} \cdot \left(1 - \frac{x}{l_B} \right)^{\zeta} \cdot g(r_H) \tag{4}$$

where

K_{T2}, K_{B2}, K_{T4}, K_{B4}: constant determined by plate material

C_T, C_B: constant

W_0: plate width at inlet before rolling

W_1: edging opening setting quantity

t_0: plate width

L_T, L_B: length of width reduction portion

ΔB_E: width restoration quantity of regular deformation portion by dogbone rolling

x: distance from leading edge of plate

l_T, l_B: length of width increasing portion

ζ: constant

r_H: horizontal rolling ratio

$g(r_H)$: function having variable of horizontal rolling ratio r_H,

said step of calculating the length in the moving direction of the plate at the irregular deformation portion produced in the rolling process includes the following calculations:

lengths L_T and L_B of the width reduction portion and lengths l_T and l_B of the width increasing portion at the irregular deformation portion are calculated in accordance with the following equations:

$$L_T = K_{T1} \cdot \left(a_{T1} - a_{T2} \cdot \frac{(W_0 - W_1)}{l_d} \right)^{\gamma} \cdot t_0^{k} \cdot W_1^{\delta} \times \left(1 + e_T \cdot \frac{(W_0 - W_1)}{W_0} \right) \tag{5}$$

$$L_B = K_{B1} \cdot \left(a_{B1} - a_{B2} \cdot \frac{(W_0 - W_1)}{l_d} \right)^{\gamma} \cdot t_0^{k} \cdot W_1^{\delta} \times \left(1 + e_T \cdot \frac{(W_0 - W_1)}{W_0} \right) \tag{6}$$

-continued

$$l_T = K_{T3} \cdot W_0^{\beta T} \quad (7)$$

$$l_B = K_{B3} \cdot W_0^{\beta B} \quad (8)$$

where

K_{T1}, K_{B1}, K_{T3}, K_{B3}: constant determined by plate material a_{T1}, a_{T2}, a_{B1}, a_{B2}, e_T, γ, k, δ, β_T, β_B: constant

ld: roll contact projection length

$$l_d = \sqrt{D_E \cdot \frac{(W_0 - W_1)}{2}}$$

D_E: diameter of edging roll,

said step of calculating the plate width adjustment efficiency on the basis of the calculated values of the width deviation distribution and the length in the moving direction of the plate includes the following calculations:

plate width adjustment efficiency distribution $\eta_T(x)$ and $\eta(x)$ at the leading edge and the trailing edge of the plate, respectively, are calculated by the following equations from the above ΔW_T, V and ΔW_B V:

$$\eta_T(x) = \eta_0 + f(x) \cdot \frac{\Delta W_{T,V}}{(W_0 - W_1)} \quad (9)$$

$$\eta_B(x) = \eta_0 + f(x) \cdot \frac{\Delta W_{B,V}}{(W_0 - W_1)} \quad (10)$$

where f(x) is a distribution curve of the width reduction upon edging and dogbone rolling, and η_0 is plate width adjustment efficiency at regular deformation portion.

4,672,831

BENDING PRESS

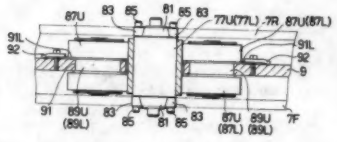
Tsuneo Kogure; Yuji Tsuchiyama, both of Hatano; Tadashi Amano, Sagamihara; Hideaki Takahashi, Atsugi; Katsuji Sekita, Hiratsuka, and Ichio Akami, Atsugi, all of Japan, assignors to Amada Company, Limited, Japan

Filed Sep. 18, 1984, Ser. No. 651,754

Claims priority, application Japan, Sep. 21, 1983, 58-144936[U]; Sep. 21, 1983, 58-144937[U]; Sep. 22, 1983, 58-145887[U]; Sep. 22, 1983, 58-145888[U]; Oct. 18, 1983, 58-193356; Oct. 20, 1983, 58-195186; Oct. 20, 1983, 58-195187; Oct. 25, 1983, 58-164009

Int. Cl.[4] B21D *5/02*

U.S. Cl. 72—21 **4 Claims**



1. A bending press, comprising:

a lower tool mounted on a lower frame having longitudinally disposed front and rear frame members;

an upper tool mounted on an upper frame;

guide blocks mounted on the frame;

a vertically movable ram mounted on the lower frame for bending cooperation of said lower and upper tools, said ram being mounted within the front and rear frame members and longitudinally disposed in the same plane as said front and rear frame members and surrounded by said frame members so as to be guided by the guide blocks, said ram having an opening near the center thereof, said lower tool being attached to said ram in a fixed position relative to said opening;

means for lifting the ram disposed in the opening, said means protruding through said opening, and being supported on the frame, said opening defined by a continuous surface in said ram with said lifting means being completely surrounded by said surface, wherein the ram is in closer proximity to the front and rear frame members than to the outside dimension, as measured in a direction perpendicular to the movement of the ram, of the means for lifting the ram, said means for lifting said ram moving in the same direction of movement as said ram;

the lifting means contacting a spherical seat on said ram so to provide a lifting force to the ram in a stress dispersing manner;

said guide blocks arranged to act on said ram on opposite sides of the lifting means.

4,672,832

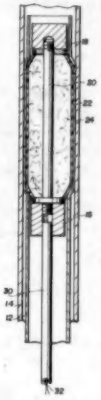
METHOD AND APPARATUS FOR TUBE EXPANSION

David E. Merker, Minerva, Ohio, assignor to The Babcock & Wilcox Company, New Orleans, La.

Continuation of Ser. No. 512,276, Jul. 11, 1983, abandoned. This application Jul. 17, 1985, Ser. No. 755,973

Int. Cl.[4] B21D *39/20*

U.S. Cl. 72—62 **11 Claims**



9. A method of radially expanding a tubular member comprising:

locating the tubular member concentrically within a tube of a nuclear steam generator while maintaining an annular space therebetween;

providing an apparatus having spaced end caps rigidly fixed to each other by a post with an expandable bladder connected to and extended between the caps and around the post to define a closed space, the bladder comprising a flexible and resilient material rapidly expandable from a position out of contact with the tubular member into contact with the tubular member responsive to the explosive generation of gas upon ignition of a propellant within the closed space and contractable out of contact with the tubular member responsive to venting of the gas from the closed space;

providing a fast burning solid propellant in the closed space which upon ignition generates large quantities of gas;

positioning the apparatus within the tubular member closely spaced away from the tubular member;

igniting the propellant to expand said bladder into contact with the tubular member and thereby expand at least a

portion of said tubular member to effect contact between the tubular member and the tube; and

venting the generated gas.

4,672,833

METHOD AND APPARATUS FOR THE TWO-STEP ROLLING OF RINGS

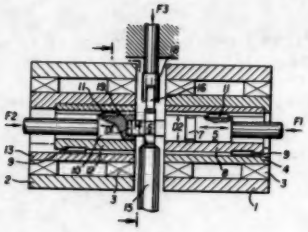
Kristine Bartko, Dohma; Dieter Gäbler, Karl Marx Stadt; Peter Heinrich, Karl Marx Stadt; Joachim Luckner, Karl Marx Stadt, and Bernd Schienkrich, Karl Marx Stadt, all of German Democratic Rep., assignors to VEB Kombinat Wälzlager und Normteile, Karl Marx Stadt, German Democratic Rep.

Filed Oct. 23, 1985, Ser. No. 790,544

Claims priority, application German Democratic Rep., Nov. 26, 1984, 269866

Int. Cl.[4] B21H *1/12*

U.S. Cl. 72—111 **2 Claims**



1. Apparatus for the two-step rolling of a ring, comprising

a bearing housing comprising a first bearing housing arranged coaxially with and on one side of a ring to be rolled and a second bearing housing arranged coaxially with and on another side of said ring opposite said one side, said first and second bearing housings being axially adjustable;

a two-step recessed rolling mandrel supported in said bearing housing, said mandrel having formed thereon a rough-rolling profile having a first smaller diameter and a finished-rolling profile having a second larger diameter;

means in said first bearing housing including a first base bushing axially adjustably and non-rotationally receiving said mandrel;

a sleeve disposed in said second bearing housing having an outer diameter substantially equal to the second larger diameter of said finished-rolling profile;

a second base bushing axially-adjustably and non-rotationally receiving said sleeve;

means defining a borehole in said sleeve, said borehole having a diameter substantially equal to the first diameter of said rough-rolling profile; and

said mandrel including a plug having a diameter substantially equal to the first diameter of said rough-rolling profile, said plug being adapted to be received and supported in said borehole, whereby two-step rolling of said ring can be performed in one continuous working sequence without changing the position of said ring.

4,672,834

METHOD FOR MAKING EXTENDED HEAT TRANSFER SURFACES AND A TOOL FOR PUTTING SAID METHOD INTO PRACTICE

Scoti Alberto, 141, Via di Petigliolo, Greve (Florence), Italy

Continuation of Ser. No. 546,948, Oct. 31, 1983, abandoned. This application Sep. 18, 1985, Ser. No. 777,565

Claims priority, application Italy, Nov. 4, 1982, 9531 A/82

Int. Cl.[4] B21D *53/04, 53/06*

U.S. Cl. 72—325 **7 Claims**

1. A tool for making integral fins on plane or curved heat transfer surfaces comprising:

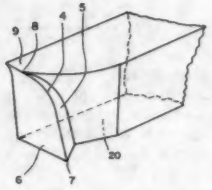
a face,

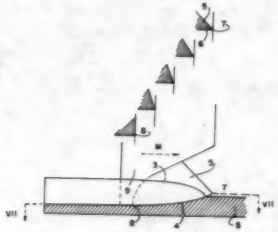
a main flank, an edge thereof forming an intersection with an edge of said face,

a pair of opposing side flanks intersected by said main flank,

a cutting edge defined by the intersection of said face and said main flank, said cutting edge having a nose portion defined as the intersection of said main flank with one of said side flanks,

said cutting edge being curvilinear and extending substantially diagonally relative to said main flank from said nose portion to said other side flank,





said face being inclined with respect to said main flank, the inclination of which defines a cutting angle, increasing from said nose portion to said other side flank, where said angle is 90° and said face merges into said other side flank without discontinuities at the intersection of said main flank and the other side flank,

said cutting edge having further a length greater than the height of the fin tc be formed.

4,672,835

APPARATUS FOR BENDING SHEET MATERIAL

Cornelis H. Liet, Denekamperdijk 38, 7581 PJ Losser, Netherlands

Filed Oct. 4, 1984, Ser. No. 657,724

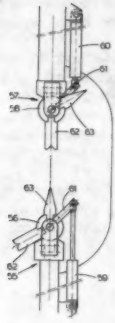
Claims priority, application Netherlands, Oct. 10, 1983, 83 03472; European Pat. Off., Jun. 8, 1984, 84200814

Int. Cl.[4] B21D *9/05*

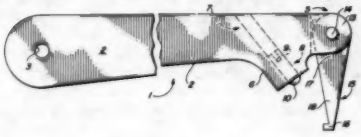
U.S. Cl. 72—389 **14 Claims**

1. Apparatus for bending sheet material, including a die having at least one longitudinally extending groove and a stamp having at least one linear contact zone contacting the sheet material to be bent, the die and the stamp being movable toward each other, wherein the die and the stamp each include a pivotably supported carrier, said carriers each carrying at least a die part and a stamp part which may be positioned into a working position by pivoting of the carrier and means defining an abutment for contacting an edge of the sheet material to

be bent, wherein the abutment is supported by a frame which is pivotably connected with the apparatus about a pivoting axis extending in parallel to the contact zone of the stamp part of the stationary carrier.



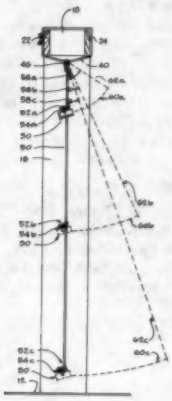
4,672,836
LOCK TAB WRENCH
Herbert C. Wilkinson, 4731 NE. 10 St., and Jesse A. Edsall, 3401 SE. 33rd Ct., both of Ocala, Fla. 32671
Filed Apr. 14, 1986, Ser. No. 851,535
Int. Cl.[4] B25B *1/06*
U.S. Cl. 72—479 **10 Claims**



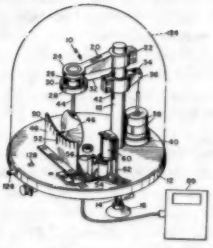
1. A lock tab wrench for removing a lock tab from the shaft of a motor, said lock tab wrench comprising a handle; a fulcrum projecting from said handle; a threaded opening provided in said handle and said fulcrum; a bolt threadibly inserted in said threaded opening, said bolt having a rounded tip normally projecting from said fulcrum for engaging the shaft; receptacle means provided at the opposite end of said bolt for adjustment of said bolt in said threaded opening; and hook means carried by said handle, said hook means adapted for engagement with the lock tab and removal of the lock tab responsive to manipulation of said handle when fulcrum is positioned on the end of the shaft.

4,672,837
TEST SYSTEM FOR WALK-THROUGH METAL DETECTOR
Walker C. Cottrell, Jr., 308 Hillwood Rd., Richmond, Va. 23226
Filed Aug. 1, 1986, Ser. No. 892,671
Int. Cl.[4] G01V *13/00*
U.S. Cl. 73—1 R **6 Claims**

1. A calibrator for a walk-through metal detector comprising a metal object simulating the least detectable metal thing sought to be detected, a flexible line, means at one end of the line for suspending it in an archway of a walk-through metal detector, and means for attaching said object at spaced positions along said line whereby the object while suspended at each of its positions along the line may be drawn back and released to swing back at different levels through the archway.



4,672,838
BEARING FRICTION TESTER
Kim R. Reh, La Verne, Calif., assignor to General Dynamics, Pomona Division, Pomona, Calif.
Continuation of Ser. No. 572,041, Jan. 19, 1984, abandoned. This application Feb. 27, 1986, Ser. No. 836,207
Int. Cl.[4] G01D *21/02*
U.S. Cl. 73—9 **12 Claims**



1. A bearing friction tester for a bearing having a concentric outer race, a concentric inner race and at least one ring of ball bearings disposed therebetween, said inner and outer races defining a rotational axis and each ring of ball bearings defining a bearing plane perpendicular to said rotation axis, said tester comprising:

a base;

a mast mounted on and extending upward from said base;

a support arm mounted on said mast adjacent an upper end thereof, said support arm extending outward from said mast;

bearing support means mounted on said support arm for rigidly fixing and supporting an outer race of a bearing under test and restraining said outer race against movement;

load support means for mounting on an inner race of the bearing under test for coupling a radial force and a rotational axis force to the inner race of the bearing under test;

a pendulum attached to said load support means, said pendulum extending downwardly from said load support means

so as to swing in a radial load plane said load support means and said pendulum being structured such that when said load support means is attached to said inner race, said radial load plane is perpendicular to said rotational axis and is positioned along said rotational axis substantially centrally between the bearing planes of the bearing under test, said pendulum providing a substantially radial force to the inner race of the bearing under test; and

lateral load means attached to said load support means for providing an axial force along said rotational axis to the inner race of the bearing under test.

4,672,839

VIBRATION SENSOR

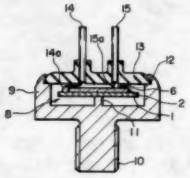
Tadashi Takeuchi, and Kunihiro Ushida, both of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

Filed Nov. 21, 1985, Ser. No. 800,258

Claims priority, application Japan, Nov. 27, 1984, 59-179853[U]

Int. Cl.[4] G01L *23/22*; G01H *11/08*

U.S. Cl. 73—35 **6 Claims**



1. A vibration sensor for sensing knocking of an internal combustion engine comprising: a metal casing having a threaded shank for direct mounting to said engine, said casing having a cavity within the face of said casing remote from said shank, a thin metal plate received in said cavity, a post projecting upwardly within said casing cavity such that said metal plate rests on said post to form a point contact between said post and said metal plate, and a piezoelectric element mounted on said metal plate, siad piezoelectric element comprising a piezoelectric body and first and second electrodes disposed on opposite surfaces thereof, said first electrode abutting said metal plate, said first electrode having an extended electrode portion extending around an edge of said piezoelectric body to the surface of the piezoelectric body on which said second electrode is disposed, a gap being present between siad extended electrode portion and an adjacent portion of said second electrode, and a resistor spanning across said gap between said extended electrode portion of said first electrode and said second electrode and being connected at opposite ends to said extended portion of said first electrode and said second electrode respectively, and a cap overlying said resistor and sealably closing off said cavity; whereby said resistor being inside the casing reduces the possibility of failure of the vibration sensor due to breakage of the resistor particularly as a result of rapid heating and cooling to which the vibration sensor is subjected.

4,672,840

METHOD AND SYSTEM FOR DETERMINING FLUID VOLUMES OF A TWO-PHASE EFFLUENT FLUID FLOW THROUGH A POROUS MATERIAL

Alvin S. Cullick, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 12, 1985, Ser. No. 797,097

Int. Cl.[4] G01N *15/08*

U.S. Cl. 73—38 **9 Claims**

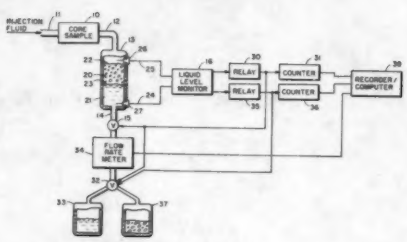
1. A method for determining fluid volumes of a two-phase effluent fluid flow through a porous material, comprising the steps of:

(a) establishing a two-phase fluid flow condition through said proous material, one phase being a liquid hydrocarbon and the other phase being an insoluble displacing liquid,

(b) collecting said two-phase fluid in a container as it passes from said porous material, said two-phase fluid separating in said container into an overlying fluid phase and an underlying fluid phase so that there is an air-fluid interface at the top of said overlying fluid phase and a fluid-fluid interface between said underlying and overlying fluid phases,

(c) positioning a fluid level monitor in said container,

(d) initiating fluid drainage from the lower portion of said container when the air-fluid interface of the top of the



overlying fluid phase rises to a first position in the upper portion of said container, the flow rate of said fluid drainage from said container being greater than the flow rate of said fluid into said container,

(e) determining a first time required for the fluid-fluid interface between said underlying and overlying fluid phases to lower to a second position near the bottom of said container,

(f) determining a second time required for the air-fluid interface of the top of the overlying fluid phase to lower to said second position near thebottom of said container,

(g) determining the flow rate of said fluid drainage from said container, and

(h) determining the volumes of each of the two phases of said fluid from said first and second time determinations and said flow rate determination, said volumes being representative of the saturation of said porous material.

4,672,841

MEASURING HEAD FOR MEASURING THE POROSITY OF A MOVING STRIP

Hans K. Schuster, Bruckmühl; Jens-Peter Heins, Feldkirchen-Westerham; Bernhard Gockel, Germering, and Holger Schmidt, Munich, all of Fed. Rep. of Germany, assignors to Gessner & Co. GmbH, Mangfall, Fed. Rep. of Germany

Filed Jul. 3, 1986, Ser. No. 882,089

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1985, 3539320

Int. Cl.[4] G01N *15/08*

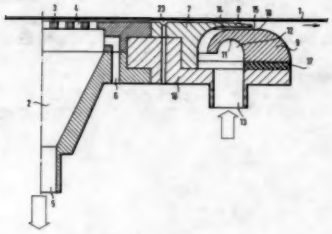
U.S. Cl. 73—38 **19 Claims**

1. In apparatus for measuring the porosity of a moving strip of porous material, where the apparatus is of the kind comprising

(i) a measuring chamber;

(ii) a measuring plate covering the measuring chamber, the measuring plate providing a surface for supporting the strip during movement of the strip across the measuring plate, the measuring plate having openings therethrough which enable air to be sucked through the moving porous strip and into the measuring chamber; and (iii) a measuring air connector through which air can be sucked out of the measuring chamber; the improvement for sealing that

portion of the moving strip adjacent to or on the periphery of the measuring plate to impede the passage of air except through the porous material situated over and near the the openings in the measuring plate, the improvement comprising



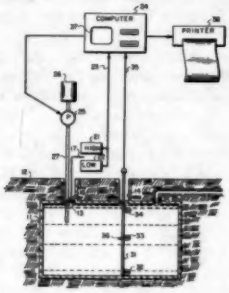
means forming a blowing slot extending around the measuring plate and providing an outwardly directed blow opening for emitting a stream of air substantially tangentially to the support surface of the measuring plate.

4,672,842

SYSTEM AND METHOD FOR AUTOMATICALLY MONITORING LIQUID VOLUME CHANGES IN STORAGE TANKS

Detlev E. M. Hasselmann, 519 S. Nardo Ave., Solana Beach, Calif. 92075

Filed Jun. 26, 1985, Ser. No. 748,926
Int. Cl.[4] G01M *3/26*
U.S. Cl. 73—49.2 **51 Claims**



46. An automated liquid volume change monitoring system for a storage tank, said system comprising:

level sensor means positioned to detect small changes in liquid level;

means for providing a signal from said level sensor means indicative of rise or fall of liquid level;

means for computing the volume of liquid change in said tank represented by the signal from said liquid level signal providing means;

means for providing a signal representative of liquid volume change due to detected level changes;

temperature sensing means comprising:

electrically variable resistance means located within said tank at a position representative of temperature of the liquid therein, the resistance of said resistance means changing substantially proportionally to the temperature change of the liquid within said tank;

a bridge circuit having said variable resistance means as one of its legs; and

means for providing an output signal from said bridge circuit representative of change in temperature detected by said variable resistance means;

means responsive to said signal from said bridge circuit to calculate tank liquid volume change due to temperature change;

means to provide a signal representing thermal liquid volume change;

computation means responsive to said signal representing liquid volume change due to thermal changes and to said signal representing liquid volume change due to detected level changes to provide a signal representing storage tank leak rate;

means for providing indication of the leak rate;

liquid flow pipe means extending from an external location into the liquid in said tank;

level adjusting means connected in said flow pipe means;

auxiliary tank means connected to said flow pipe means

precision weighing means coupled with said auxiliary tank means to accurately determine liquid weight differences within said auxiliary tank means;

means to provide a signal to said volume computing means from said weighing means representing the volume of liquid in said auxiliary tank means;

means responsive to said rise and fall indication signal to provide a level adjustment signal; and

means connecting said level adjustment signal to said level adjusting means to energize said level adjusting means to transport said liquid between said storage tank and said auxiliary tank to maintain the liquid level in said storage tank substantially constant;

said volume computing means being responsive to said weighing means signal to calculate the amount of liquid transported between said storage tank and said auxiliary tank and provide a signal representing liquid volume change;

said flow pipe means comprises an inlet pipe and an outlet pipe;

said level adjusting means comprises a pump connected in said outlet pipe to transport liquid from said storage tank to said auxiliary tank;

said level adjusting means further comprising valve means connected in said inlet pipe to allow liquid to flow from said auxiliary tank to said storage tank under the force of gravity;

said level adjustment signal controlling the operation of said pump means and said valve means to maintain substantially constant liquid level in said storage tank.

4,672,843

PEAK COMBUSTION PRESSURE TIMING DETECTOR FOR IC ENGINE USING INTAKE VALVE DEFORMATION

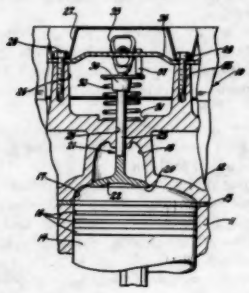
Donald J. Poznick, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 21, 1986, Ser. No. 853,924
Int. Cl.[4] G01M *15/00*
U.S. Cl. 73—117.3 **2 Claims**

1. In an internal combustion engine having a rotating crankshaft, a combustion chamber with an intake valve opening thereto, means to introduce a combustible charge through the intake valve opening, means to initiate ignition of the combustible charge, and a poppet valve effective to close the intake valve opening during combustion, the poppet valve comprising a valve closing member deformable by combustion pressure, a stem effective to move longitudinally in response to said deformation and a detectable member effective to move with the stem during the longitudinal movement thereof, peak combustion pressure timing sensing apparatus comprising:

a probe fixed with respect to the stationary portion of the engine and disposed adjacent the detectable member so as to be sensitive to the longitudinal position thereof, the probe being effective to generate an output electric signal varying with the longitudinal position of the detectable

member and therefore of the valve stem, the output electric signal reaching a detectable peak value concurrent with peak combustion chamber pressure and resulting peak deformation of the valve closing member; and



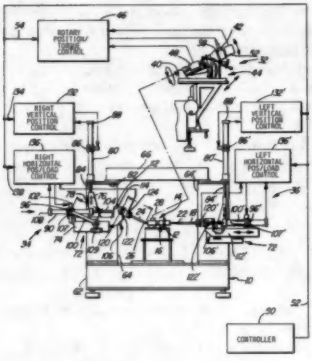
means effective to reference the peak value with the crankshaft rotational position of the engine so as to indicate the timing thereof.

4,672,844

TESTING APPARATUS WITH IMPROVED FOLLOWER MECHANISM

Walter E. Meyer, Leonard, Mich., assignor to Schenck Pegasus, Troy, Mich.

Filed Mar. 26, 1986, Ser. No. 844,461
Int. Cl.[4] G01M *17/04*
U.S. Cl. 73—118.1 **9 Claims**



1. Testing apparatus for applying force to a test-piece having a movable test member adapted for predetermined movement, said apparatus comprising:

fixed support means adapted to hold said test-piece,

movable support means movable relative to said fixed support means along a first axis,

force applying means mounted on said movable support means for translational movement along a second axis transverse to said first axis,

coupling means connected with said force applying means and adapted to be connected with said test member for transmitting force from the force applying means to the test member,

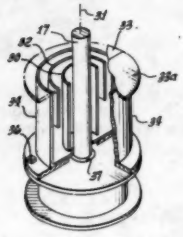
and linkage means movable concurrently with said movable support means and coupled to said force applying means for moving it along said second axis so that the movement of the force applying means imparts said predetermined movement to said test member, whereby said force applying means can apply a controlled force to said test member during said movement and unaffected by said movement.

4,672,845

POLISH ROD TEMPERATURE SENSING SYSTEM AND ROD STROKING CONTROL

Michael Hirsch, Pacific Palisades; Peter D. Kristensen, Hawthorne, both of Calif., and William W. Dunn, San Antonio, Tex., assignors to Production Monitoring and Control Co., San Antonio, Tex.

Filed May 20, 1985, Ser. No. 735,546
Int. Cl.[4] F04B *49/00*; G01K *13/04*; E21B *47/10*
U.S. Cl. 73—151 **11 Claims**



5. In a well polish rod temperature sensing system installed at a well head polish rod stuffing box location, and connected to circuitry whose output changes as a function of the temperature change of the polish rod, the combination comprising

(a) first means including a first temperature sensor located in proximity to the polish rod to sense its temperature T_1,

(b) second means including a second temperature sensor for sensing temperature T_2 of the environment near the well head,

(c) said first and second sensors connected to said circuitry,

(d) and a housing containing said first and second means and adapted for installation at a well head in association with the polish rod stuffing box,

(e) said first means including first structure extending at least part way about the polish rod, and said second means including second structure shielded by said first structure from direct exposure to the polish rod, said first structure extending generally vertically at one side of the polish rod, and said second structure also extending vertically at said one side of the polish rod but further from the polish rod than said first structure, the height of said second structure being less than the height of said first structure,

(f) there being a housing connected to and extending above the stuffing box and containing said first and second means, the polish rod extending vertically through the housing.

4,672,846

MULTI-FUNCTION PRESSURE PROBE FOR AIRCRAFT

Henri LeBlond, Versailles, and Louis Cabot, Paris, both of France, assignors to Badin Crouzet Aerodrom de Toussus-le-Noble, Chateaufort, France

Filed Sep. 3, 1985, Ser. No. 771,621
Claims priority, application France, Sep. 3, 1984, 84 13631
Int. Cl.[4] G01C *21/00*
U.S. Cl. 73—180 **6 Claims**

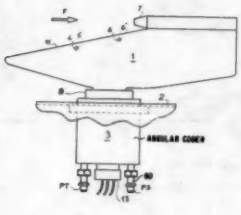
1. An apparatus for determining the incidence angle of an aircraft relative to an airflow around said aircraft comprising:

a streamlined body;

a means for mounting said body with one degree of freedom such that said body orients itself freely within said flow, said body including means for sampling total pressure of

said flow and means for sampling static pressure of said flow;

a mechanical means for measuring an angle αm of said body relative to said aircraft;



a pneumatic means for measuring an angle αa of said body relative to said airflow; and

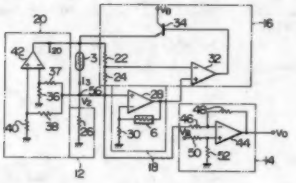
a means for summing αm and αa and providing an output α indicative of said true angle of incidence of said aircraft relative to said airflow.

4,672,847

HOT-WIRE FLOW RATE MEASURING APPARATUS

Kaoru Uchiyama, and Mitsukuni Tsutsui, both of Ibaraki, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 29, 1985, Ser. No. 759,866
Claims priority, application Japan, Jul. 27, 1984, 59-158259
Int. Cl.[4] G01F *1/68*
U.S. Cl. 73—204 **16 Claims**



1. A hot-wire flow rate measuring apparatus comprising:

a first thermo-sensitive resistive element disposed in the flow path of fluid under measurement;

first resistor means connected in series with said first thermo-sensitive resistive element to form a first series circuit;

a second thermo-sensitive resistive element for temperature compensation disposed in the flow path of the fluid;

second resistor means connected in series with said second thermo-sensitive resistive element to form a second series circuit;

means for detecting the difference between a voltage corresponding to a voltage across said first thermo-sensitive resistive element and a voltage produced by said second thermo-sensitive resistive element;

means for controlling a current fed to said first series circuit in accordance with the voltage detected by said detecting means;

an output circuit for outputting a voltage indicating a flow rate of the fluid in accordance with the voltage across said first resistor means;

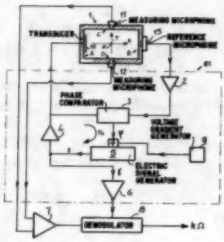
a current circuit including means for supplying a compensation current, which is controlled by a voltage across said first resistor means, to a part of said first series circuit, whereby variations of the output characteristics of said output circuit caused by the variations of the characteristics of said thermo-sensitive resistive elements can be compensated in accordance with said compensation current.

4,672,848

ACOUSTIC GYROMETER

Christian Gohin, Magny, and Henri Leblond, Versailles, both of France, assignors to Badin Crouzet, Chateaufort, France

Filed Oct. 26, 1984, Ser. No. 665,369
Claims priority, application France, Nov. 2, 1983, 83 17513
Int. Cl.[4] G01P *9/00*
U.S. Cl. 73—505 **8 Claims**



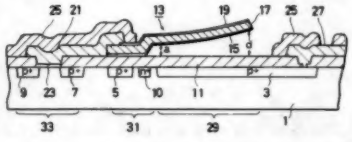
1. A gyrometer of the type employing the influence of the Coriolis force on a fluid contained in a resonant cavity and comprising exciting means for generating and maintaining longitudinal acoustic oscillations in said cavity along an axis of excitation, and means for measuring the transverse pressure variations appearing at the level of a vibration node along an axis of measurement, when the cavity is displaced about an axis perpendicular to the plane of the oscillations, characterized in that means are provided for effecting servo-control in phase of the acoustic excitation wave of the cavity, whereby the phase difference of the acoustic pressures on the two walls of the cavity perpendicular to the excitation axis, respectively, is maintained at a constant value, thus resulting in resonance of the cavity said cavity having a natural frequency along said axis of measurement which is the same as a natural frequency along said axis of excitation, and wherein said exciting means maintains the frequency of said oscillations equal to said natural frequency along said axis of measurement and said natural frequency along said axis of excitation.

4,672,849

SEMICONDUCTOR VIBRATION DETECTING STRUCTURE

Shigeo Hoshino, Yokosuka, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Apr. 9, 1986, Ser. No. 849,862
Claims priority, application Japan, Apr. 10, 1985, 60-74447
Int. Cl.[4] G01N *29/04*
U.S. Cl. 73—579 **14 Claims**



1. A semiconductor vibration detecting structure having a semiconductor substrate (1) of a first conductivity type, a plurality of semiconductor layers (3, 5, 7, 9) of the second conductivity type opposite to that of the substrate diffused in the substrate, and a cantilever (13) comprising a root portion fixed to the substrate (1) through an insulator film and a movable beam (19) projecting from the root portion, the structure comprising:

a fixed capacitor portion (31) formed between the root portion of said cantilever and said semiconductor substrate through the insulator film; and

a variable capacitor portion (29) formed between the movable beam (19) of the cantilever and said semiconductor substrate, said cantilever gradually deflecting upward from the surface of said semiconductor layer towards the distal end of the cantilever.

4,672,850

APPARATUS FOR MEASURING THE VIBRATIONS OF A SPIRAL BEVEL GEAR DRIVE ON A GEAR TESTING MACHINE

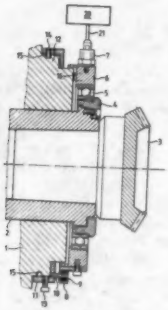
Erhard Konersmann, Wallisellen, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Bührle AG, Zürich, Switzerland

Filed Feb. 10, 1986, Ser. No. 827,863

Claims priority, application Switzerland, Feb. 27, 1985, 00893/85

Int. Cl.[4] G01N *29/04*

U.S. Cl. 73—593 **5 Claims**



1. An apparatus for measuring the vibrations of a spiral bevel gear drive on a gear testing machine having a headstock and a spindle for mounting a gear of the spiral bevel gear drive, comprising:

a vibration pickup device;

at least one evaluation device for evaluating the quality of said spiral bevel gear drive and cooperating with the vibration pickup device;

a measuring ring arranged at said headstock for carrying said vibration pickup device;

means for rotatably mounting said measuring ring on said spindle; and

means for positionally fixing said rotatably mounted measuring ring in a selected position in relation to said headstock.

4,672,851

ACOUSTIC EVALUATION OF THERMAL INSULATION

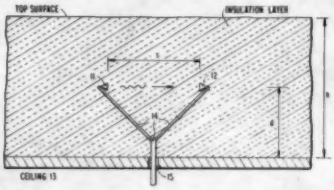
Gerald V. Blessing, Frederick, and Daniel R. Flynn, Gaithersburg, both of Md., assignors to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Filed May 30, 1986, Ser. No. 868,483

Int. Cl.[4] G01N *29/00*

U.S. Cl. 73—597 **8 Claims**

1. A method for measuring the density, thickness, and thermal conductivity of an insulation layer in an attic space above a ceiling comprising inserting at least one probe through a small aperture in the ceiling having transducer means thereon for transmitting and receiving acoustical signals, transmitting an acoustic signal from a first transducer through the insulation material to a second transducer and calculating the density, thickness, and thermal conductivity of the insulation by comparing the measurement of the received signal with standard values for the same type of insulation.



4,672,852

TEST MANIPULATOR EXTERNALLY APPLICABLE TO A PIPE

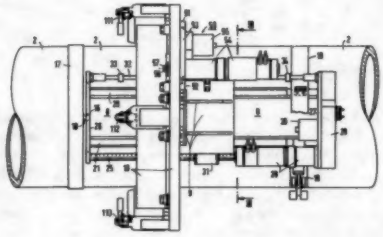
Georg Gugel, Kalchreuth, and Erich Haas, Leinburg, both of Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim an der Ruhr, Fed. Rep. of Germany

Filed Aug. 16, 1984, Ser. No. 641,572

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1983, 3329483

Int. Cl.[4] G01V *29/04*

U.S. Cl. 73—622 **12 Claims**

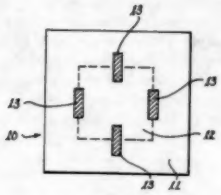


1. A test manipulator externally applicable to a pipe, adaptable for ultrasonically testing welded seams, the manipulator having a divided race for surrounding a pipe which is to be tested, a guide segment guided by the race at the periphery thereof, a test system carrier drivable in peripheral direction around a pipe, a driving and positioning device for the test system carrier and at least one test head holder fastenable to the test system carrier, comprising clamping means for fastening the race directly to the pipe in centered relationship to an adjustment mark located on the pipe; the guide segment mounted so as to be movable along the periphery of the race; an outrigger unit flangeable, together with the test system carrier and the test head holder, to said guide segment; and a saddle fastenable to the pipe in centered relationship to said adjustment mark; during testing of a pipe connection seam, said guide segment and the race, alternatively, being, respectively, movable on said saddle in axial direction of the pipe, and being, together with the test system carrier, rotatable on said guide segment in peripheral direction around the pipe.

4,672,853
APPARATUS AND METHOD FOR A PRESSURE-SENSITIVE DEVICE

Robert E. Hickox, Tucson, Ariz., assignor to Burr-Brown Corporation, Tucson, Ariz.

Filed Oct. 30, 1984, Ser. No. 666,372
Int. Cl.[4] G01L 7/08, 9/06, 19/04
U.S. Cl. 73—708 3 Claims

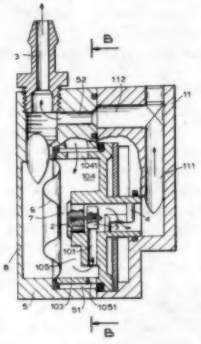


1. A pressure sensing device having monolithic elements associated therewith, comprising, in combination:
- a single crystal of silicon having a diaphragm region and a frame region;
- piezo-resistive elements located near a boundary of said diaphragm and said frame;
- conducting elements coupling said piezo-resistive elements into a bridge circuit having input and output terminals;
- temperature compensating means including a resistive means having a positive temperature coefficient coupled between said output terminals of said bridge circuit to provide temperature compensation of said bridge circuit; and
- a plurality of trimmable resistance element means for balancing said bridge circuit, each of said trimmable resistive means located in series with each of said piezo-resistive elements.

4,672,854
CONVERTER OF THE RATE OF FLOW OF A FLUID

Dimiter T. Todorov; Slavtcho G. Djudjev, and Kiril D. Yarumov, all of Sofia, Bulgaria, assignors to V M E I "Lenin" , Sofia, Bulgaria

Filed Nov. 5, 1985, Ser. No. 795,089
Claims priority, application Bulgaria, Nov. 5, 1984, 67412
Int. Cl.[4] G01F 1/08
U.S. Cl. 73—861.33 4 Claims



1. A converter of the rate of flow of a fluid, comprising:
- an external casing with a base, inlet and outlet means and connecting conduits;
- a cylindrical measuring chamber with tangential inlet and axial outlet,
- said cylindrical measuring chamber being disposed inside said external casing;
- a turbine wheel with flat rectangular blades, said turbine wheel being seated in bearings inside said cylindrical measuring chamber,
- said turbine wheel being disposed in front of said tangential inlet;
- a photoelectric converter of frequency of rotation of said turbine wheel,
- said photoelectric converter being disposed in the plane of said blades of said turbine wheel;
- a damper of pulsations of fluid flow,
- said damper being formed in said external casing,
- said damper composed of an inlet chamber and an outlet chamber separated by a flexible membrane,
- said inlet chamber of said damper being hydraulically connected to said tangential inlet of said cylindrical measuring chamber,
- said outlet chamber of said damper is connected to said axial outlet of said cylindrical measuring chamber and said outlet means of said external casing;
- said cylindrical measuring chamber has a cylindrical casing with a smooth internal surface,
- said cylindrical casing being disposed in said base of said external casing;
- a free annular space being defined between said cylindrical casing and said base of said external casing;
- an outer wall in a first half of said chamber defines a hole;
- an outer wall in a second half of said chamber defines a compensation hole,
- said compensation hole being disposed in front of said tangential inlet at an end of said tangential inlet opposite to said turbine wheel;
- a guiding element being disposed in said axial outlet of said cylindrical measuring chamber,
- said guiding element being composed of a spiral surface, a bottom transverse base and a top transverse base,
- said transverse bases being shaped as circular sectors,
- said bottom transverse base closes only part of a cross-section of the inside of said cylindrical measuring chamber, thereby defining a free section of said cross-section of said inside of said cylindrical measuring chamber,
- said transverse bases being interconnected by said spiral surface so that said circular sector of said top transverse base being disposed aligned to correspond to said free section of said cross-section defined by said bottom transverse base,
- said spiral surface begins above said tangential inlet of said cylindrical measuring chamber; and
- a hydraulic throttle being formed between said axial outlet of said cylindrical measuring chamber and said outlet chamber of said damper in said base.

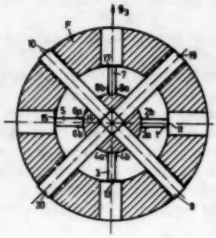
4,672,855
DEVICE FOR MEASURING FORCES AND TORQUE IN DIFFERENT DIRECTIONS

Lothar Schmieder, Gernholzweg 4, 8031 Gilching, Fed. Rep. of Germany

Filed May 6, 1986, Ser. No. 860,121
Claims priority, application Fed. Rep. of Germany, May 6, 1985, 3516234
Int. Cl.[4] G01L 5/16, 1/26
U.S. Cl. 73—862.04 7 Claims

1. In a device for measuring forces and torque in different directions, said device including a rigid, round hub and an annular flange that is disposed parallel to said hub, with said flange and said hub being connected with one another via four spokes that are arranged in the shape of a cross, are secured in said hub, and are deformed by a load due to their dimensions, with such a deformation being measured with the aid of elongation-measuring strips, with said hub and said flange themselves remaining rigid, the improvement wherein: each of said spokes has an outer end remote from said hub, with each outer

end being secured to said flange via a respective thin, circular member, the thickness and diameter of which are such that each member yields readily in response to deflection and pivoting of said spokes about tangential axes, while tangential displacements are substantially eliminated; the diameter of each of said circular members is at least 2.5 times as great as the diameter of said spokes, and the thickness of each such member has an upper limit defined by the equation



$$\frac{f_{member}}{f_B} = \frac{k_1\beta^2}{4}\left(\frac{a^2}{hl}\right)^3 \geq 10$$

where f_{member} is the maximum deflection of the member, f_B is the maximum deflection of the spoke, k_1 is a function of β,β equals 2R/a, R is the radius of the member, a is the thickness of the spoke, h is the thickness of the member, and l is the length of the spoke.

4,672,856

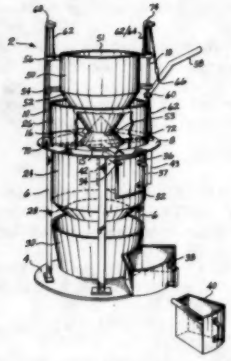
SAMPLE SPLITTER

Gevan R. Marrs, Puyallup, Wash., and Kathryn A. Prieve, Thousand Oaks, Calif., assignors to Weyerhaeuser Company, Tacoma, Wash.

Filed Jun. 20, 1986, Ser. No. 876,627

Int. Cl.[4] G01N *1/00*

U.S. Cl. 73—863.52 **5 Claims**



1. In a sample splitting device of the type used to divide a larger particulate sample into representative smaller portions, the improvement which comprises:

a framework supporting the device;

a fixed, generally conical, sample splitter having an upwardly oriented apex;

a moveable, open bottom sample receiving hopper means mounted coaxially above the sample splitting means, said hopper means being translatable between a lower position and an upper position and being in contact with the sample splitter means when in the lower position so as to enclose a sample retaining volume, said sample being released to fall by gravity when the hopper means is moved to the upper position;

translating means attached to the frame to raise and lower the hopper means;

a generally cylindrical skirt means mounted coaxially below the sample splitter means to retain falling sample particles, said skirt means having a diameter greater than the diameter of the sample splitter means; and

sample receving means mounted below the sample splitter means and within the skirt means, said receiving means having an open sample receiving area less than the cross sectional area of the skirt means to receive a predetermined fraction of the sample being divided.

4,672,857

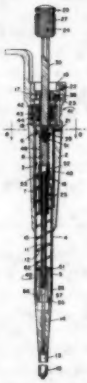
LIQUID MICRODISPENSER

Bruce R. MacDermott, Berkeley, Calif., assignor to Labindustries, Inc., Berkeley, Calif.

Filed Sep. 10, 1985, Ser. No. 774,531

Int. Cl.[4] B01L *3/02*

U.S. Cl. 73—864.18 **10 Claims**



1. A pipet for dispensing liquids comprising:

a handle having upper and lower ends, a longitudinal axis and a bore extending therethrough along said axis;

an operating shaft coaxially supported in the upper end of said handle for reciprocable sliding movement in said bore;

rod means supported coaxially within said bore and extending from an upper region of said bore to a lower region of said bore said rod means being supported for reciprocable movement along said handle axis and comprising upper rod means and lower rod means supported longitudinally within said upper rod means, said lower rod means being slidably engaged with said upper rod means;

a dispensing tip including an upper end and a lower dispensing end, said dispensing tip having conduit means interconnecting said two ends;

a piston supported for reciprocable movement in said conduit means;

first means extending from said handle lower end, for coupling said dispensing tip upper end to said handle lower end;

second means, carried by said rod means, for coupling said piston with said operating shaft; and

means, slidably carried within said handle, for uncoupling said dispensing tip from said handle and said piston from said rod means, said uncoupling means including means

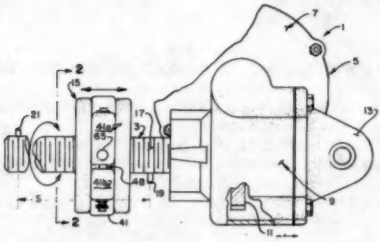
for extending said upper rod means over said lower rod means to disconnect said piston from said rod means, whereby said handle and said dispensing tip may be separated from one another.

4,672,858

NUT/CLUTCH FOR LINEAR ACTUATOR POWER SCREW

Emil J. Langowski, Winnebago County, Ill., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Oct. 17, 1985, Ser. No. 788,624
Int. Cl.[4] F16H *1/20*
U.S. Cl. 74—424.8 R **2 Claims**



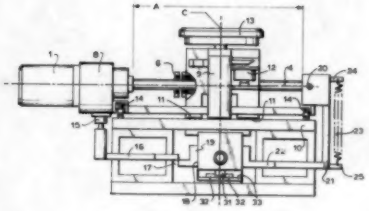
1. In a linear actuator comprising a power screw, means for rotatably driving sad power screw, means for mounting said linear actuator with respect to its application, and means linearly driven by said power screw for converting said rotary motion of said power screw into linear movement of at least a portion of said application on a line generally parallel to the axis of said power screw, wherein the improvement comprises: a nut threadably engageable with said power screw for lineal movement along said power screw upon rotation of the latter, said nut having a body and a central threaded opening threadably receiving said power screw, said body having a circumferential groove, a collar received in said circumferential groove, said collar comprising two substantially similar collar members each having a part-circular surface and side wall surfaces thereon, each said collar member having a trunnion protruding from one side thereon for direct connection of said collar to said application thereby to transmit lineal forces between said nut and said application, said collar members being received in said circumferential groove on substantially opposite sides of said nut, said collar members being secured together by a pair of pins on opposite sides of said collars, with one end of each pin being secured to a respective collar member, and with the other end of each pin being slidably received in the other collar member, a spring surrounding a portion of a respective said pin for resiliently holding said part-circular surfaces of said collar members in frictional engagement with said groove base within a predetermined range of frictional forces, said power screw having a pair of spaced stops carried thereby and rotatable therewith, one of said stops being engageable by said nut so as to prevent further axial movement of said nut along said power screw in one direction and so as to rotate said nut with respect to said collar upon continued rotation of said power screw in said one direction, said nut being movable along said power screw through a predetermined stroke limited at one end of said stroke by said one stop and limited at the other end of said stroke by another of said stops, the distance between said stops corresponding generally to the length of said stroke, said other stop being engageable by said nut so as to prevent further axial movement of said nut along said power screw in the other direction therealong and so as to positively rotate said nut with respect to said collar upon continued operation of said power screw in said other direction, said circumferential groove having a base and side walls, said collar having a part-circular surface frictionally engageable with said groove base and said collar sides being frictionally engageable with said groove side walls, said collar being somewhat narrower than the distance between said groove side walls such that with said nut in engagement with one of said stops, said nut will rotate with said power screw and said collar is held against rotation by said application, and such that with said nut clear of said stop, said power screw rotates relative to said nut so as to forcefully drive said nut in one axial direction along said screw such that one of the collar sides frictionally engages a respective groove side wall thereby to frictionally hold said nut relative to said collar against rotation with said power screw, and so as to ensure that said nut and said collar, together with the portion of said application connected to said collar, move axially with respect to said power screw.

4,672,859

APPARATUS FOR COORDINATE POSITIONING

Vassil N. Vatzov; Krestyo T. Savov, and Stefan G. Stanev, all of Botevgrad, Bulgaria, assignors to NPSK PO Polupravodnikova Technika, Botevgrad, Bulgaria

Filed Mar. 3, 1986, Ser. No. 835,336
Int. Cl.[4] G05G *11/00*
U.S. Cl. 74—479 **3 Claims**



1. Apparatus for coordinate positioning of an object placed upon a working table, comprising

first and second stepping motors mounted in two mutually perpendicular planes;

two bellows clutches;

a top lead screw and a bottom lead screw,

said first stepping motor is connected by means of one said bellows clutches to said top lead screw, and said second stepping motor is connected by means of another said bellows clutches to an end of said bottom lead screw;

two cut nuts, one each screwed onto said top lead screw and said bottom lead screw;

a cradle having a left end and a right end, seating both ends of said top lead screw,

said cradle defining a working length A of said top lead screw;

a body with legs, said body is fastened to said cut nut of said top lead screw;

a base supporting said legs of said body;

means carried upon said base for vertical lifting of said working table;

bearings for supporting said cradle upon said base;

a carrier of length W for said bottom lead screw, said carrier is connected to said cut nut of said bottom lead screw, said carrier having a left side and a right side;

means on the left connecting said left end of said cradle to said left side of said carrier;

means on the right connecting said right end of said cradle to said right side of said carrier;

said means on the left and said means on the right are so configured as to dispose a normal, central axis of said working table in the center of said length W of said carrier;

a first pin, fastened to said cradle;

a second pin, fastened to said means on the left;

a spring connects said first pin to said second pin;

a column carrying one end of said bottom lead screw guiding sleeves fastened inside said carrier, in an area in proximity to said cut nut of said bottom lead screw;
a cantilever carrying the outer end of said bottom lead screw;
a bearing mounted in a bush which is fastened with a great clearence in said cantilever, said bearing being at one end of said bottom lead screw opposite said bellows clutches;
said cantilever and said column dispose said bottom lead screw in the middle of the working distance of said top lead screw;
a T-square with guideways, one side of said T-square is fastened to said cantilever, another side of said T-square is fastened to said column; and
a rule fastened to an outside of said carrier, said rule is disposed between said guideways of said T-squares

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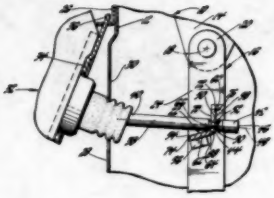
4,672,860

PUSH ROD TO PEDAL ARM CONNECTION

Donald L. Parker, Middletown, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 6, 1986, Ser. No. 826,893
Int. Cl.[4] G05G *1/14*
U.S. Cl. 74—512 **3 Claims**



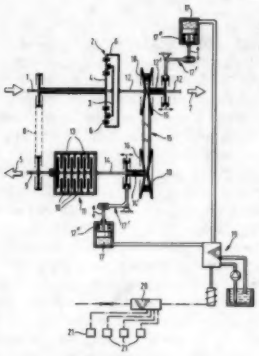
1. A connection between a pedal arm mounted by pivot means on a fixed body portion and a push rod for a brake booster, said connection comprising:
said pivotally mounted pedal arm being pivotally movable in a plane;
said push rod being normally positioned with its longitudinal axis parallel to the plane of pedal pivotal movement, said push rod having one end connected for actuation of a brake booster and the other end connected for force-transmitting movements between the push rod and the pedal arm, and a reduced diameter portion adjacent said other end defined by axially spaced shoulders;
and a bracket secured to said pedal arm, said bracket having a body portion and mounting means by which said bracket is secured to said pedal arm, said body portion being bent to define a radius bend surface along a bend axis substantially perpendicular to the plane of pedal pivotal movement to provide an upper body section and a lower body section, said body sections having ends remotely spaced from the bend axis and normally located closer to said push rod one end that is the bend axis, said upper body section having an open-ended slot formed therein, said slot having an outer end opening through the upper body section remotely spaced end, said slot extending toward the bend axis and terminating in a slot inner end located substantially on the bend axis, said slot outer end defining a slot entry for receiving said push rod reduced diameter portion during installation connection of said push rod with said pedal arm, and slot retainer sides joining said slot entry and said slot inner end, said slot retainer sides being spaced apart so that the width of said slot from said slot entry to the slot inner end is at least as large as the diameter of said push rod reduced diameter portion so as to receive said push rod reduced diameter portion therebetween in sliding guided relation during installation connection of said push rod to said pedal arm;
said push rod being connected to said pedal arm after positioning said reduced diameter portion in said slot entry and sliding it into said slot so that it is positioned in said slot inner end with said shoulders operatively engaging opposite sides of said bracket body in the vicinity of said radius bend surface in force-transmitting relation with one of said shoulders receiving force from pedal arm pivotal movement in one direction and the other of said shoulders receiving force from pedal arm pivotal movement in the opposite direction, said shoulders also being capable of delivering force from said push rod to said pedal arm in said one direction and said opposite direction, the angle of the bracket bend formed by said bracket upper and lower body portions at said bend axis then preventing removal of said push rod from said slot inner end once the brake booster has been secured in operational relation to said pedal arm.

4,672,861

DRIVE SYSTEM FOR AUTOMOBILES HAVING TWO DRIVEN AXLES

Heribert Lanzer, Goessendorf, Austria, assignor to Steyr-Daimler-Puch AG, Vienna, Austria

Filed Oct. 11, 1985, Ser. No. 786,662
Claims priority, application Austria, Oct. 12, 1984, 3253/84
Int. Cl.[4] F16H *37/00*
U.S. Cl. 74—665 GE **6 Claims**



1. A drive system for an automotive vehicle having two driven axles, comprising
a differential gearing having two output members, each of said output members operatively connected to said driven axles respectively to distribute torque to said driven axles,
a fluid friction clutch having first and second parts coupled to each other, said first part being driven by said first output member, said second part being driven by said second output member, said first and second parts receiving input from said first and second output members at all times, and
a change speed gearing disposed between one of said output members and its associated clutch part,
whereby said fluid friction clutch is actuable as a differential lock for said differential gearing, and the ratio of torque distributed to said two driven axles is adjustable.

4,672,862

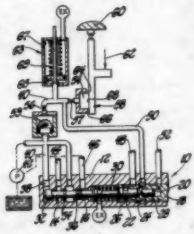
HYDRAULIC CONTROL SYSTEM INCLUDING A TORQUE SENSOR

Howard E. Chana, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 27, 1986, Ser. No. 823,018
Int. Cl.[4] B60K *41/04*; F15B *5/00*
U.S. Cl. 74—843 **3 Claims**

2. A hydraulic control mechanism for a torque transmitting

device comprising in combination; torque input means; torque output means; chain drive means between said input and output means; a source of fluid pressure; torque sensing means being disposed for rotatably supporting one of said input and output means and having imposed thereon a reaction force proportional to the torque transmitted by said chain drive means and including a chamber having a fluid pressure therein proportional to the reaction force; valve means for regulating the fluid pressure at said fluid pressure source; fluid passage means for communicating fluid from said source to said chamber; said passage means including torque increase flow restriction means and torque decrease flow restriction means; fluid accumulator



means in fluid communication with said passage means at a position downstream of said torque increase flow restriction and upstream of said torque decrease flow restriction; an accumulated torque sensing pressure in said passage means between said flow restrictions being in fluid communication with said valve means and being operable on said valve means to influence the pressure level of said source to a value proportional to the torque transmitted, and said accumulator means being effective in combination with said flow restrictions to delay any rapid change in the pressure level of said source during rapid torque changes at said torque transmitting device when transient torques are present.

4,672,863

METHOD AND APPARATUS FOR CONTROLLING POWER TRANSMISSION SYSTEM IN AN AUTOMOTIVE VEHICLE

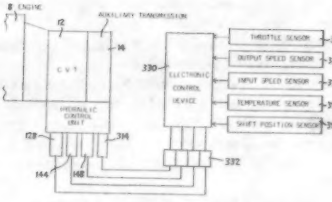
Hiroshi Itoh, and Mitsuru Takada, both of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Apr. 15, 1986, Ser. No. 852,811

Claims priority, application Japan, Apr. 17, 1985, 60-81792; Apr. 17, 1985, 60-81793

Int. Cl.[4] B60K *41/12, 41/18, 41/16*

U.S. Cl. 74—866 **25 Claims**



1. A method of controlling a power transmitting system for an automotive vehicle which includes an engine, the power transmitting system having a continuously variable transmission with a continuously variable speed ratio, and an auxiliary transmission which is connected in series with the continuously variable transmission and which has at least two shift positions for forward driving of the vehicle, wherein the auxiliary transmission is automatically shifted from one of said at least two shift positions to the other, said method comprising the step of:

automatically shift said auxiliary transmission from one of said at least two shift positions to the other based on an actual running speed of said vehicle, an actually required power output of said engine, and an actual speed ratio of said continuously variable transmission.

4,672,864

CONTROL SYSTEM FOR AN INFINITELY VARIABLE TRANSMISSION

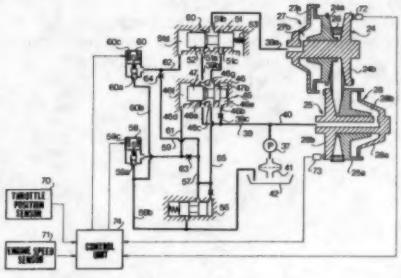
Yoshihiko Morimoto, Mitaka, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 8, 1985, Ser. No. 796,474

Claims priority, application Japan, Nov. 16, 1984, 59-241956

Int. Cl.[4] B60K *41/12, 41/18*

U.S. Cl. 74—866 **11 Claims**



1. In a system for controlling an infinitely variable transmission for transmitting the power of an internal combustion engine having a throttle, a clutch operatively connecting the engine to the transmission, the transmission comprising a drive pulley having a hydraulically shiftable first disc and a first hydraulic cylinder for shifting the first disc, a driven pulley having a hydraulically shiftable second disc and a second hydraulic cylinder for operating the second disc, and a belt engaged with both pulleys, the system comprising a pressure oil circuit having a pump for supplying oil for the cylinders, a line pressure control valve having a first spool for controlling line pressure of pressurized oil from the pump, and a transmission ratio control valve having a second spool for controlling the pressurized oil so as to move the first disc of the drive pulley to change the transmission ratio of the transmission, the improvement in the system comprising:

a first hydraulic circuit for applying a first control pressure to one end of the first spool of the line pressure control valve so as to axially move the first spool;

a second hydraulic circuit for applying a second control pressure to one end of the second spool of the transmission ratio control valve so as to axially move the second spool;

an electronic control unit comprising

first means responsive to throttle position of the engine for producing a desired engine speed,

second means responsive to the desired engine speed and to speed of the driven pulley for calculating a desired transmission ratio,

third means responsive to speeds of the drive pulley and driven pulley for producing a signal corresponding to actual transmission ratio,

fourth means responsive to the desired transmission ratio and to the actual transmission ratio for producing a first output signal representing an amount of shifting of the second spool of the transmission ratio control valve,

fifth means responsive to the engine speed and to the throttle position of the engine for detecting engine torque,

sixth means responsive to the desired transmission ratio and the engine torque for producing a second output signal,

seventh means for producing a clutch engagement signal during engagement of the clutch, and

eighth means responsive to the clutch engagement signal for passing the first and second output signals;

a first electromagnetic valve provided in the first hydraulic circuit and having a first coil responsive to the passing second output signal for controlling the first control pressure applied to the first spool of the line pressure control valve; and

a second electromagnetic valve provided in the second hydraulic circuit and having a second coil responsive to the passing first output signal for controlling the second control pressure applied to the second spool of the transmission ratio control valve, whereby the transmission ratio and the line pressure are controlled to transmit the engine torque.

4,672,865

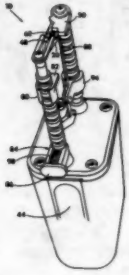
THERMAL WIRE STRIPPER

Tony Nespor, 2515 Glencoe Rd., Baltimore, Md. 21234

Filed Dec. 23, 1985, Ser. No. 812,327

Int. Cl.[4] H02G *1/12*

U.S. Cl. 81—9.4 **27 Claims**



1. In a wire stripper of the type having a pair of upstanding electrodes with a metal strip stretched between them and electrically connected for heating by them, the metal strip having structure defining a longitudinal slot with converging sides for engaging and melting insulation on a length of wire inserted into the slot, enabling the wire to be pulled away free of insulation on said length, the improvement comprising: means for preventing nicking of wire by said converging sides including said converging sides defining a plurality of sets of successively smaller substantially parallel slot portions with respective spacings corresponding to wire gauges, and a member with adjustable provision for limiting passage along said sets of successively smaller substantially parallel slot portions of wire of a size larger across than a selected said set.

4,672,866

AUTOMATIC FASTENER SYSTEM WITH FASTENER DETECTION MEANS

Frank J. Riera, 576 Colebrook, Troy, Mich. 48083, and Brent A. Thorn, 15401 Hubbard Ave., Livonia, Mich. 48154

Filed Jun. 6, 1985, Ser. No. 742,061

Int. Cl.[4] B25B *23/06*

U.S. Cl. 81—57.37 **28 Claims**

1. An automatic screwdriver system including, in combination:

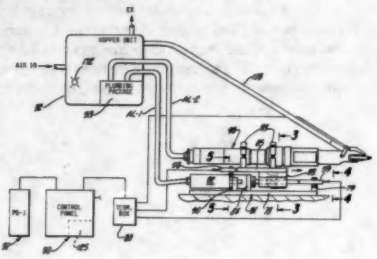
(a) a fastener driving means including a hollow head unit;

(b) means to detect the presence of a fastener in said hollow head unit, said means to detect including

(i) a pivoting member mounted to said hollow head unit and normally biased downwardly in the absence of a fastener, but constructed so as to be biased upwardly when a fastener is in position to be driven, the forward portion of said pivoting member being complimentary in shape to a fastener to be driven;

(ii) spring means to aid in biasing said pivoting member downwardly; and

(iii) a switch means mounted to said hollow head unit and



operated by said pivoting member to indicate the presence of a fastener in said hollow head unit;

(c) means to advance and retract said fastener driving means;

(d) means to control connected to said fastener driving means, said means to detect, and said advance and retract means; and

(e) means to supply fasteners to said fastener driving means.

4,672,867

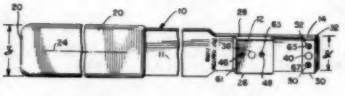
FLEXPLATE TURNING TOOL

Saulo Rodriguez, McAllen, Tex., assignor to Lisle Corporation, Clarina, Iowa

Filed Aug. 5, 1985, Ser. No. 762,638

Int. Cl.[4] B25B *13/48, 7/02*

U.S. Cl. 81—176.1 **3 Claims**



1. A wrench tool for gripping a limited access disc such as a flexplate of the type having an arcuate, raised rib adjacent at least a portion of the circumference thereof, said rib having radially spaced arcuate surfaces, said tool comprising, in combination:

an elongate handle extending to and integrally connected with an operating wrench end;

said handle and wrench end generally defining a unitary member;

said wrench end comprising a rectangular parallelepiped with a generally flat planar surface;

first and second gripping jaws mounted on the planar surface of the wrench end and fastened thereto in opposed spaced relation, said first gripping jaw comprising a generally rectangular parallelepiped block, said first jaw attached on one side of the planar surface at the distal end of the wrench end;

said second gripping jaw also comprising a generally rectangular parallelepiped block, said second jaw also attached on the same one side of the planar surface, coplanar with the first jaw and spaced from the first jaw to define a gap, said gap having a generally uniform width slightly greater than the width of the arcuate rib which is to be gripped by the tool and defined by spaced, generally opposed, generally planar jaw side surfaces with edges for engagement with the arcuate surfaces of the arcuate rib, said planar

side surfaces being inclined relative to the planar surface of the wrench end; and

fastening means for attaching one of said jaws to the planar surface on the wrench end, said one jaw having at least two side surfaces, one of the side surfaces being retained by the fastening means in opposed relation to the side surface of the other jaw to thereby define the dimension of the gap, said one jaw being pivotal to position the other side surface of said one jaw to redefine the dimension of the gap, said fastening means asymmetrically mounting said jaw whereby pivoting of said jaw to alter the choice of side surface defining the gap will effect a change in the dimension of the gap.

4,672,868

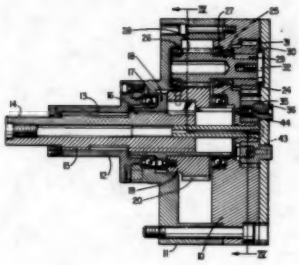
CROSS-FEED FACING HEAD

Ralph H. Rawle, Windsor, Canada, assignor to J. P. Tool Limited, Windsor, Canada

Filed Apr. 2, 1986, Ser. No. 847,226

Int. Cl.[4] B23B *3/26*

U.S. Cl. 82—2 E **14 Claims**



1. A cross-feed facing head comprising:

a housing adapted to be mounted on a spindle for rotation therewith,

at least one slide mounted in at least one transverse slideway in an end face of the housing, said slide including means for mounting a cutting tool and being adapted for movement transversely to the axis of rotation of the housing,

an actuating member axially, slideably mounted within the housing and having external helical teeth thereon,

an annular gear member mounted within the housing for rotation about the axis thereof, said annular gear member having gear teeth on the outer cylindrical edge thereof and teeth on the inner cylindrical edge thereof for engagement with said helical teeth of the actuating member,

at least one rotatable pinion shaft mounted in said housing for rotation about an axis parallel to the axis of rotation of the housing, said pinion shaft having at one end thereof pinion teeth mating with the outer gear teeth of said annular gear member and having at the other end thereof a spur gear mating with a rack on one side of said at least one slide.

4,672,869

GUIDING AND FEEDING DEVICE FOR A WORK BAR IN A LATHE

Heinz Hasslauer, Uhingen, and Seweryn Gawronski, Esslingen, both of Fed. Rep. of Germany, assignors to Traub GmbH, Reichenbach/Fils, Fed. Rep. of Germany

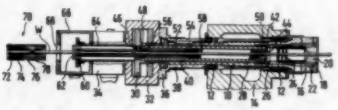
PCT No. PCT/EP85/00224, § 371 Date Jan. 2, 1986, § 102(e) Date Jan. 2, 1986, PCT Pub. No. WO85/05300, PCT Pub. Date Dec. 5, 1985

PCT Filed May 14, 1985, Ser. No. 823,868

Claims priority, application Fed. Rep. of Germany, May 24, 1984, 3419417

Int. Cl.[4] B23B *13/02, 13/12*

U.S. Cl. 82—2.5 **7 Claims**



1. A guiding and feeding device for a work bar (W) in a lathe, comprising:

a hollow work spindle (10) having a front end and a rear end,

a chuck (20) attached to the front end of the work spindle (10),

an actuating tube (28) guided for axial displacement within the work spindle (10),

an actuating piston (30) arranged in a cylinder (32) behind the rear end of the work spindle (10), the actuating tube (28) interconnecting the acuating piston (30) and the chuck (20) so as to transform an axial force generated by the actuating piston (30) into a clamping force exerted by the chuck (20) onto the work bar (W),

an intermediate tube (40) disposed within the actuating tube (28) and having a front end near the chuck (20) and a rear end near the actuating piston (30), a front guide sleeve (50 or 80) arranged stationarily within the intermediate tube (40) at the front end thereof and adapted for guiding the work bar (W),

a rear guide sleeve (52 or 84) axially spaced from the front guide sleeve (50 or 80), said rear guide sleeve (52 or 84) being adapted to guide the work bar (W) and having a rear abutment face (62), the rear guide sleeve (52 or 84) being guided for axial displacement within the intermediate tube (28) and, in a position of rest, cooperating with an abutment at the rear end of the intermediate tube (28),

at least one spring (58 or 88) tending to keep the rear guide sleeve (52 or 84) in its position of rest, and

a stock feeder (70) aligned with the work spindle (10) and reciprocable in the axial direction thereof to advance the work bar (W), the stock feeder (70) being adapted to abut against the rear abutment face (62) of the rear guide sleeve (52 or 84) and urge the same towards the front guide sleeve (50 or 80).

4,672,870

VACUUM DIE CUTTING APPARATUS FOR FOAM BACKED MATERIALS

Martin M. Levene, and William W. Lessard, both of Kitchener, Canada, assignors to Ontario Die Company Limited, Waterloo, Canada

Continuation-in-part of Ser. No. 657,747, Oct. 4, 1984, which is a continuation-in-part of Ser. No. 590,961, Mar. 19, 1984, Pat. No. 4,543,862. This application Jan. 10, 1985, Ser. No. 690,159

The portion of the term of this patent subsequent to Oct. 1, 2002, has been disclaimed.

Int. Cl.[4] B26D *7/02*

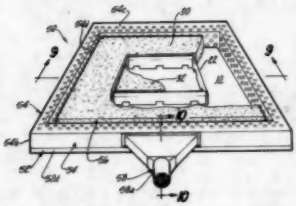
U.S. Cl. 83—19 **19 Claims**

1. In a method of cutting compressible materials with a stationary steel rule cutting die wherein one or more layers of

the materials are placed over the sharpened edge of a steel rule cutting die, the layers and die are covered with an air-impervious cover sheet and a backing pad, the volume covered by the cover sheet is evacuated, and the layers are pressed on to the die to cut the layers against the backing pad, the improvement wherein:

(A) said pressing step is performed in a stationary press;

(B) said evacuating step is performed by the use of a vacuum hose attached to the die prior to movement of the die and layers into the press;



(C) the vacuum hose is removed from the die prior to completion of the movement of the die and layers through the press; and

(D) means are provided to maintain the vacuum condition upon removal of the vacuum hose so that the movement of the die and layers through the press may be completed with the vacuum condition intact but with the vacuum hose removed.

4,672,871

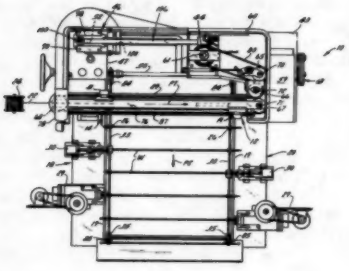
ADJUSTABLE APPARATUS FOR CUTTING AND CONVEYING WIRE SEGMENTS OF VARIOUS LENGTHS

Ragnar Gudmestad, West Allis, Wis., assignor to ARTOS Engineering Company, New Berlin, Wis.

Filed Jun. 27, 1985, Ser. No. 749,587

Int. Cl.[4] B21F *11/00*

U.S. Cl. 83—151 **12 Claims**



3. Apparatus for severing a wire segment from a wire strand and for conveying said wire segment comprising:

wire feed means for feeding said wire strand along a first path, said wire feed means comprising a cable having a pair of parallel cable flights which are reciprocably movable axially in opposite directions parallel to said first path and a pair of wire feed clamps for releasably gripping said wire strand, each wire feed clamp being fixedly connected to and movable with one cable flight, each of said wire feed clamps having two spaced apart extreme operating positions, said wire feed means further comprising cable drive means to effect reciprocating movement of said cable flights in opposite directions to thereby move each of said wire feed clamps between its two extreme operating positions during wire feeding operations;

a pair of laterally spaced apart adjustably positionable conveyor assemblies, each conveyor assembly comprising at least one conveyor clamp, a pair of said one conveyor clamps in said pair of conveyor assemblies being adapted to receive said wire strand from said wire feed clamps and to grip and convey a wire segment cut therefrom along a second path transverse to said first path;

wire cutter means for cutting said wire segment from said wire strand while the wire strand is gripped by said pair of conveyor clamps;

first means operable for adjustably moving said conveyor assemblies laterally relative to each other in a direction parallel to said first path so as to change the spacing between said conveyor clamps;

and second means synchronized with adjusting movement of said conveyor assemblies for effecting axial shifting movement of said wire feed clamps and said cable to thereby change the spacing between the two extreme operating positions of each wire feed clamp and thereby change the length of said wire strand to be received by said pair of conveyor clamps.

4,672,872

CUTTING DEVICE WITH A HEATED CUTTING WIRE

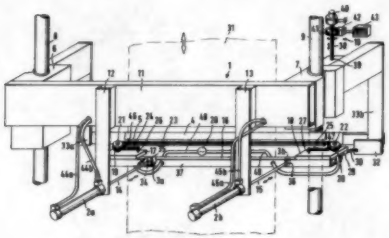
Egbert Kuehnert, Erzhausen, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 25, 1985, Ser. No. 791,328

Claims priority, application Fed. Rep. of Germany, Oct. 27, 1984, 3439455

Int. Cl.[4] B26D *7/10*

U.S. Cl. 83—171 **5 Claims**



1. A cutting device, comprising:

(a) at least two vertically disposed guide rods;

(b) a guide connected to each of said guide rods, said guide vertically moveable along said guide rod by a positioning device;

(c) a first rectangular tube connecting said guides;

(d) at least two vertical struts attached to said first rectangular tube;

(e) a double-acting guide cylinder fastened to each of said vertical struts, said guide cylinder comprising a piston rod which extends through said vertical strut and is mounted to a second rectangular tube positioned below said first rectangular tube;

(f) means for mounting said guide cylinder to said second rectangular tube;

(g) a horizontal fastening plate attached to each end of said second rectangular tube;

(h) a rotatable ball bearing attached to each of said fastening plates;

(i) a horizontally disposed heated cutting wire suspended between and guided by said rotatable ball bearings; and

(j) means attached to each of said fastening plates for tensioning said cutting wire, said tensioning means compris-

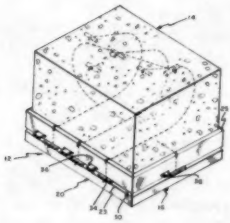
ing a pin retained on each of said fastening plates and a spring attaching said pin to an end of said cutting wire.

4,672,873

CHEESE CUTTER APPARATUS

Robert E. Kinser, 5717 E. 75th, Hutchinson, Kans. 67502

Filed Apr. 4, 1986, Ser. No. 849,257
Int. Cl.[4] B26D *1/547*
U.S. Cl. 83—200.1 **11 Claims**



1. A cutter apparatus operable to slice foodstuff products, comprising:

(a) a main support assembly;

(b) a cutter means connected to said main support assembly including a cutter actuator assembly;

(c) said cutter actuator assemblyincluding a cutter assembly connected to one side of said main support assembly and having an actuator handle member connected to one end of a cutter filament member;

(d) said cutter filament member is placed across a top surface of said main support assembly before the foodstuff is placed thereon;

(e) said actuator handle member is grasped to pull said cutter filament member upwardly and through the food product for a cutting operation;

(f) said cutter actuator assembly includes a retractable filament assembly mounted on said main support assembly under said top surface and connected to said cutter filament member; and

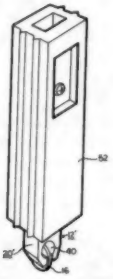
(g) said retractable filament assembly connected to another end of said cutter filament member is operable to retract same into said main support assembly under said top surface when in a storage or inoperative condition.

4,672,874

GLASS SCORING ASSEMBLY

Paul Gach, 9801 S. A1A–#387, Jensen Beach, Fla. 33457

Continuation of Ser. No. 674,852, Nov. 26, 1984, Pat. No. 4,628,784. This application Jun. 5, 1986, Ser. No. 870,923
Int. Cl.[4] B26D *3/08*; C03B *33/10*
U.S. Cl. 83—881 **7 Claims**



1. A glass-scoring assembly including a scoring wheel rotatably mounted on an axle to a mounting bracket, said mounting bracket having a slot with an open end and a closed end which defines a supporting structure for said scoring wheel, the open end of the slot permitting extension of said scoring wheel from the mounting bracket and the closed end of the slot providing for enhanced clearance between said scoring wheel and said bracket so as to assure for ease of displacement of glass chips and other debris which can accumulate at the interface between the scoring wheel and the mounting bracket during the glass-scoring process,

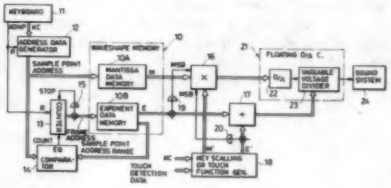
said enhanced clearance being achieved by enlargement in the slot above the point of engagement of the axle and the slot so that the width of the slot at the closed end is greater than the width of the slot at the open end.

4,672,875

WAVESHAPE MEMORY FOR AN ELECTRONIC MUSICAL INSTRUMENT

Hideo Suzuki, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Sep. 13, 1984, Ser. No. 650,910
Claims priority, application Japan, Sep. 14, 1983, 58-168358
Int. Cl.[4] G10H *7/00*
U.S. Cl. 84—1.01 **12 Claims**



11. In an electrical musical instrument of the type wherein a complete musical waveshape is stored as sample points in a memory and read out to produce a musical tone, the waveshape sample points each being represented by a floating point number having a mantissa value and an exponent value, the improvement for memory size reduction wherein:

the mantissa value of every sample point is stored in a separate memory location, and wherein

for each group of sequential sample point values having the same exponent value, only one exponent value is stored, wherein each exponent value is stored in a separate memory location.

4,672,876

RHYTHM TONE SOURCE ASSIGNING APPARATUS FOR USE IN ELECTRONIC MUSICAL INSTRUMENT

Jun Sugiyama; Akira Suzuki; Kosei Terada; Shigenori Oguri, and Shigeki Ishii, all of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Jun. 3, 1986, Ser. No. 870,090
Claims priority, application Japan, Jun. 7, 1985, 60-123917; Feb. 14, 1986, 61-30513
Int. Cl.[4] G10H *1/42, 7/00*
U.S. Cl. 84—1.03 **6 Claims**

1. A rhythm tone source assigning apparatus for use in an electronic musical instrument, comprising:

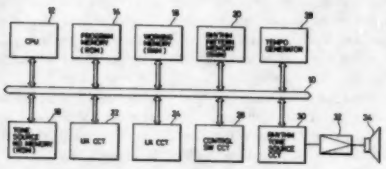
a plurality of input operating manipulators for being assigned with either one of a plurality of mutually different rhythm tone sources;

memory means associated with each one of said plurality of input operating manipulators and containing therein a plurality of storing regions corresponding to said plurality of input operating manipulators, respectively;

selecting means associated with said plurality of rhythm tone sources for selecting either one of said plurality of rhythm

tone sources which is to be assigned to said plurality input operating manipulators; and

writing-in means associated with said memory means for writing, when either one of said plurality of input operating manipulators is actuated, a rhythm tone source designating datum corresponding to a rhythm tone source selected by said selecting means in a storing region corresponding to the actuated input operating manipulator among said plurality of storing regions.



4,672,877

TAILPIECE OF A GUITAR

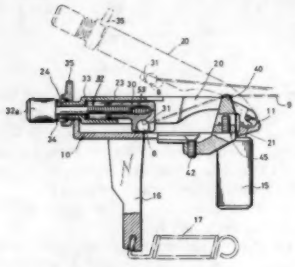
Yoshiki Hoshino, and Kazuhiro Matsui, both of Aichi, Japan, assignors to Hoshino Gakki Co., Ltd., Japan

Filed Feb. 14, 1986, Ser. No. 830,068

Claims priority, application Japan, Mar. 26, 1985, 60-044525[U]

Int. Cl.[4] G10D *13/04*

U.S. Cl. 84—299 15 Claims



1. A tailpiece and bridge assembly for a stringed musical instrument, comprising:

a plurality of pivot levers, each pivot lever adapted to receive a respective string; means supported on the body of the instrument for defining pivots for the pivot levers, each pivot lever extending toward the rear of the stringed instrument from its pivot, each said pivot lever being independently pivotable on its pivot with respect to the other pivot levers between a position substantially toward the body of the instrument and a pivoted position upraised from the body of the instrument;

securing means on each pivot lever and spaced rearwardly from the pivot therefor, to which a respective string may be secured; the securing means on the lever being movable along the lever selectively rearwardly and forwardly of the guitar body for selectively adjusting the tension of the string; and

bridge saddle means disposed on the body of the instrument rearwardly on the instrument of the pivots for the levers, and the levers extending rearwardly of the bridge saddle means; the bridge saddle means being forward on the instrument body of the securing means for the strings on the levers; the bridge saddle means including a top section over which the strings for the instrument can pass.

4,672,878

HEAD JOINTS FOR TRANSVERSE FLUTES

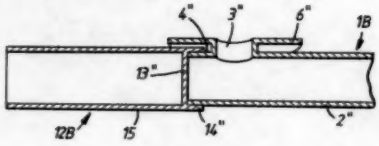
Ian S. T. Senior, 23 Vicarage Lane, King's Langley, Hertfordshire, WD4 9HS, England

Filed Feb. 12, 1986, Ser. No. 828,690

Claims priority, application United Kingdom, Feb. 13, 1985, 8503692

Int. Cl.[4] G10D *7/02*

U.S. Cl. 84—384 8 Claims



1. A transverse flute head joint, comprising

(a) a hollow cylindrical wall member; and

(b) a closure device for closing one end of said cylindrical wall member to define an acoustic chamber therein, said cylindrical wall member containing an embouchure hole in communication with said acoustic chamber, said closure device comprising a cap including

(1) a rigid transverse end wall portion defining one end of said acoustic chamber; and

(2) an integral annular flange portion extending axially from said end wall portion concentrically about said one end of said cylindrical wall member in airtight engagement with the outer peripheral surface thereof.

4,672,879

SHAPED MECHANICAL COMPRESSION PACKING

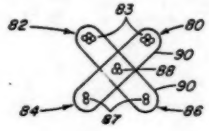
George B. Champlin, Stoneham, Mass., assignor to Seal Company of New England, Manchester, N.H.

Continuation-in-part of Ser. No. 450,517, Dec. 17, 1982, Pat. No. 4,550,639. This application Nov. 1, 1985, Ser. No. 794,165

The portion of the term of this patent subsequent to Nov. 5, 2002, has been disclaimed.

Int. Cl.[4] D04C *1/06, 1/12;* F16J *15/22, 15/26*

U.S. Cl. 87—7 6 Claims



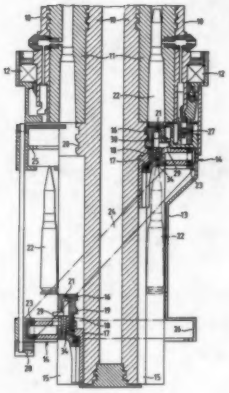
1. In braided mechanical compression packing of rectilinear cross-section having exterior "A," "A'" positions and interior "B" positions, the combination of a plurality of axial warp yarns placed in a predetermined non-symmetrical density pattern, and carrier yarns being braided about said warp yarns, whereby parallelism in opposite cross-sectional sides of said packing is maintained as said packing is wrapped about a cylindrical surface, said packing including warp yarns at positions other than the interior corners of the packing, thereby to provide against any of the warp yarns popping out of the braid and to provide said non-symmetrical pattern.

4,672,880

FIRING APPARATUS FOR AN EXTERNALLY POWERED FIRING WEAPON

Erwin Bohler, Zurich, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Bürhle, Zurich, Switzerland

Filed Nov. 21, 1985, Ser. No. 800,202
Claims priority, application Switzerland, Dec. 10, 1984, 5845/84
Int. Cl.[4] F41F *11/00*
U.S. Cl. 89—12 3 Claims



1. A firing apparatus for firing a cartridge in an externally powered firing weapon containing at least one revolving weapon barrel, comprising:

a reciprocatable breechblock operatively associated with said at least one revolving weapon barrel;

means for positively reciprocating said breechblock relative to said at least one revolving weapon barrel;

a spring-loaded firing pin displaceably mounted in said breechblock;

two displaceable control cams for cocking and releasing said firing pin in order to pierce said cartridge;

displacing means for displacing said two displaceable control cams from an unarmed position into a firing position;

said displacing means containing a control slide provided with two control grooves extending in opposite directions;

a spring operatively connected to said control slide and urging said control slide into an unarmed position of said control slide; and

said displacing means containing hydraulic piston means acting upon said control slide in order to displace said control slide into a firing position of said control slide and against the force of said spring.

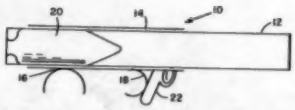
4,672,881

RECOILLESS ROCKET LAUNCHER

Robert E. Betts, and Jerrold H. Arszman, both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 28, 1986, Ser. No. 891,717
Int. Cl.[4] F41F *3/045*
U.S. Cl. 89—1.816 8 Claims

1. A recoilless rocket launcher comprising a rocket launch tube adapted for receiving and launching a rocket from a shoulder firing position of a gunner; a support member for said rocket launch tube; and resilient means positioned between said support member and said rocket launch tube and in intimate contact with both said support member and said rocket launch tube for resiliently coupling said support member to said rocket launch tube to permit relative freedom of movement of said rocket launch tube and said support member, said support member including a firing mechanism as an integral part thereof in the form of a hand grip member which enables the gunner to fire said rocket from a shoulder held position whereby one point of contact of said support member is with the hand of the gunner and another point of contact of said support member is with the shoulder of the gunner, said resiliently coupled support member effective in achieving an offset



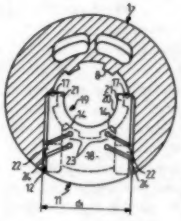
of time of transfer mechanism and reduced total impressed forces transferred between said rocket launch tube and said point of contact with the gunner to permit said rocket to exit said rocket launch tube prior to the transfer of any of said impressed forces to gunner and as a result of said offset of time and said reduced total impressed forces transferred to said gunner an improvement in accuracy of launching said rocket to a target is achieved.

4,672,882

ABUTMENT KEY FOR THE VALVE PLUNGER OF A BRAKING ASSISTANCE SERVOMOTOR, AND A SERVOMOTOR EQUIPPED WITH SUCH A KEY

Henry Pagot, Villetaneuse, France, assignor to Bendix France, Paris, France

Filed Mar. 26, 1986, Ser. No. 844,434
Claims priority, application France, Mar. 27, 1985, 85 04555
Int. Cl.[4] F15B *9/10*
U.S. Cl. 91—369 A 7 Claims



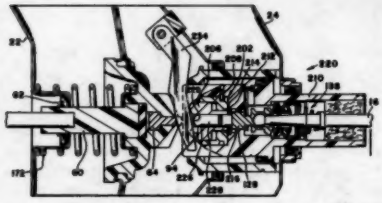
1. Abutment key for the plunger (4) of the distribution valve (3) of a braking assistance servomotor, the key being intended to be housed in a radial slot (12) in an assistance piston hub portion (1) of the servomotor, the key (11) being formed from a metal plate and comprising a body portion (18), an end portion (19) having a transverse width (d_2) which is less than a transverse width (d_1) of the radial slot (12) and is shaped with a cut-out (20) forming two end arms (21), and retaining means on the body portion (18) for co-operation with at least one adjacent wall of the radial slot, characterized in that the body portion (18) of the key (11) has two flexible fingers (22) which extend laterally and angularly in a direction away from said end portion (19) and both terminate in a sharp angle (24), a transverse distance (d_3), at rest, between the angles (24) being greater than the transverse width (d_1) of the radial slot (12).

4,672,883

REACTION MECHANISM FOR BRAKE BOOSTER

Lawrence R. Myers, South Bend, Ind., assignor to Allied Corporation, Morristown, N.J.

Filed Dec. 2, 1985, Ser. No. 803,359
Int. Cl.[4] F15B 9/10; F01B 19/00
U.S. Cl. 91—369 A 6 Claims



1. A reaction mechanism for a tandem brake booster having first and second walls that move in opposite directions within a cavity to produce first and second output forces in response to an input force applied to a control member and a force transmitting lever arrangement through which said second output force is presented to an output member and combined therein with said first output force to create a joint output force, said force transmitting lever arrangement having first and second arm means each of which has a first end connected to said second wall, a fulcrum, and a second end connected to said output member, each of said arm means having a first cam surface that engages said fulcrum and a second cam surface that engages said output member, said first and second cam surfaces directing said second output force along a force vector substantially parallel to said output member to prevent the introduction of forces that may rotate said first wall, the improvement comprising:

a first plunger carried by said first wall and having a projection that extends therethrough;

a second plunger carried by said control member, said second plunger having a first connecting member and a second connecting member;

reaction lever means having third and fourth arm means each of which has a first end connected to said second wall and a second end that engages said projection on said first plunger, each of said third and fourth arm means having a cam surface that extends from the first end toward said second end; and

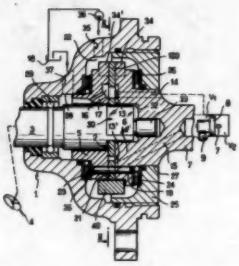
resilient means having a spring with first and second sections, each of said first and second sections having a frusto conical section, said first and second sections being located between said control member and first connecting member, said spring urging said first connecting member into constant engagement with said cam surface on said second end of said reaction lever means, said first plunger responding to said joint output force by moving to provide said second end of said third and fourth arm means with a reaction force, said reaction force being transmitted through said first connecting member to balance said input force applied thereto into said control member, said spring having a rate corresponding to said cam surfaces such that the first connecting means moves toward said second plunger in response to said reaction force, said reaction force overcoming said spring when a predetermined input force is produced to bring said second connecting member into engagement with said second end of said lever means and thereafter directly transfer said input force into said force transmitting lever arrangement.

4,672,884

ROTARY HYDRAULIC DISTRIBUTOR, PARTICULARLY FOR AN ASSISTED STEERING MECHANISM

Jorge E. Rosell, and Carlos M. Folch, both of Barcelona, Spain, assignors to Bendiberica S.A., Barcelona, Spain

Filed Oct. 23, 1985, Ser. No. 790,584
Claims priority, application Spain, Oct. 29, 1984, 537,458
Int. Cl.[4] F15B 9/10
U.S. Cl. 91—375 R 11 Claims



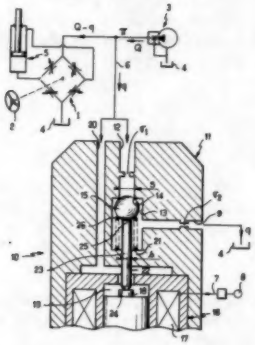
1. A hydraulic distributor, particularly for an assisted steering system of a motor vehicle, which comprises, in a casing, a first rotary valve member and a second rotary valve member fixed in rotation respectively to an input shaft and an output shaft which are coaxial, said rotary valve members cooperating mutually so as to form selectively fluid flow passages between a source of fluid under pressure, respective compartments of a hydraulic assistance actuator, and a reservoir as a function of relative angular position of said rotary valve members on each side of a central rest position, said first rotary valve member consisting of a rotor in the form of a star-shaped disc having arms formed with apertures which are closed peripherally and each bounded laterally by substantially radial masking portions of the corresponding arm, said rotor having opposite axial surfaces cooperating in sliding contact with adjacent axial surfaces facing each other of said second rotary valve member, into which open, firstly, in line with said masking portions, distribution openings respectively connectable to said compartments of said hydraulic actuator, and secondly, in line with said apertures of said arms of said rotor, fluid return openings connectable to said reservoir, and a resilient device for returning and centering said input and output shafts and including at least one C-shaped spring having facing ends and arranged around said input shaft, and first and second connecting means joining said input and output shafts, respectively, to said c-shaped spring, characterized in that said C-shaped spring is arranged around said star-shaped rotor, and in that said first connecting means comprises a portion of at least one of said arms of said star-shaped rotor which extends radially outwardly between said facing ends of said C-shaped spring, said second connecting means comprising at least one external projecting portion of said second rotary valve member which extends adjacent said first connecting means, and said C-shaped spring having bearing zones extending axially on each side of said spring.

4,672,885

SERVO DEVICE FOR CONTROLLING FLOW IN A HYDRAULIC INSTALLATION, PARTICULARLY FOR THE ASSISTED STEERING OF A VEHICLE

Gilbert Kervagoret, Argenteuil, France, assignor to Bendix France, Paris, France

Filed Mar. 11, 1986, Ser. No. 838,746
Claims priority, application France, Mar. 13, 1985, 85 03688
Int. Cl.[4] B62D 5/08
U.S. Cl. 91—450 6 Claims



1. A Servo device for controlling flow in a hydraulic installation (1,5), particularly for the assisted steering of a vehicle, comprising a source of pressure (3) whose outlet is connected to a system (1) for controlling a hydraulic actuator (5), the device (10) being intended to be interposed in a branch hydraulic line (6) between the outlet of the source of pressure (3) and a reservoir (4) and comprising a body (11) having an inlet passage (12) which is intended to be connected to the outlet of the source of pressure (3), an outlet passage 9 which is intended to be connected to the reservoir (4), and an intermediate passage (13) between the inlet and outlet passages in which a control component (15) is situated, the control component (15) controlling the flow of fluid between the inlet passage (12) and the outlet passage (14) and being regulated by an electromagnetic control means (16) as a function of an electrical control signal (7), characterized in that the control component (15) consists of a valve component cooperating with a valve seat (14) formed in the intermediate passage (13), the valve component (15) being situated in the intermediate passage (13) and being biased against a value seat (14) by a spring (26) and by a first end (25) of a push-rod (23) which is slidingly sealingly mounted in a bore (22) of the body connecting the intermediate passage (13) to an internal chamber (19) which communicates permanently with the inlet passage (12), the push-rod (23) having a second end (24) cooperating, in the chamber (19), with a plunger (18) of the electromagnetic control means (16).

4,672,886

OSCILLATING AIR STREAM APPARATUS FOR AUTOMOBILE DEFROSTER

Ronald D. Stouffer, Silver Spring, Md., assignor to Bowles Fluidics Corporation, Columbia, Md.

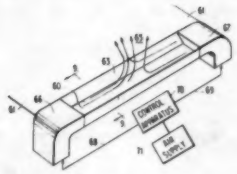
Filed May 24, 1985, Ser. No. 737,609
Int. Cl.[4] B60H 1/00; B05B 1/26
U.S. Cl. 98—2.09 16 Claims

1. An air control system for selectively controlling the direction of air flow from a source under pressure to ambient comprising,

an air flow trough having a bottom wall running along a predetermined axis and a part of ends at opposing ends of said bottom wall,

a pair of nozzles at each end of said trough each one of said nozzles being oriented to project an air jet toward the opposite one of said nozzles respectively,

means connecting each of said nozzles to said source of air



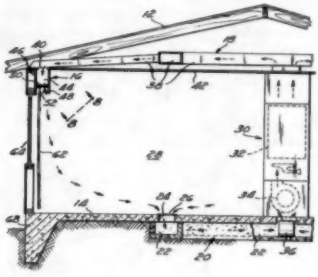
under pressure for projecting said pair of air jets, respectively, along the axis of said air flow trough in opposing directions, whereby, air is projected outwardly from said trough transversely of the axis thereof when said respective air jets contact each other.

4,672,887

COMBINATION VALANCE AND CONDITIONED AIR ADMISSION AND RETURN DUCTS

Fred C. Sproul, Sr., 1286-129 Discovery St., San Marcos, Calif. 92069

Continuation-in-part of Ser. No. 563,090, Dec. 19, 1983, abandoned. This application Apr. 25, 1985, Ser. No. 726,929
Int. Cl.[4] F24F 3/044
U.S. Cl. 98—31.6 5 Claims



1. An improved air treatment system for a dwelling comprising:

an air diffusion chamber associated with the ceiling and having at least a portion thereof in a position of close proximity to an outer wall of the dwelling;

an opening formed in the chamber facing downwardly in close proximity to the wall and paralleling the wall for venting the chamber to the room;

a conditioning unit having integral fan means for generating a flow of conditioned air to the chamber;

means for conducting the air from the generating means to the chamber;

means for returning the air vented into the room to the air generating means;

a suspended valance member associated with and extending below the chamber for concealment of the opening from view within the room;

an auxiliary fan located in the air returning means to cause the returned air to be drawn through the air returning means and be forced into the integral fan means of the conditioning unit;

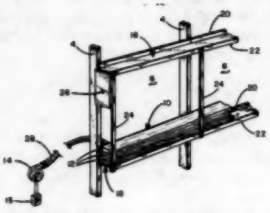
said air return means comprising a network of interconnected concrete channels constructed directly in the ground to extend beneath each of the rooms of the structure and be concealed by the floor of the structure; and plural apertures extending through the flooring to communicate with the network of channels, said plural apertures positioned to provide at least one aperture in each of the major rooms of the structure; said network of interconnected channels additionally formed to receive service utilities for said structure.

4,672,888

INFLATABLE GREENHOUSE VENT COVER

Terence G. Crombie, Northfield, and Bernard K. Wong, Edina, both of Minn., assignors to Insul-Rib, Inc., Castle Rock, Minn.

Filed Jan. 3, 1985, Ser. No. 688,465
Int. Cl.[4] F24F *13/10*
U.S. Cl. 98—29 **10 Claims**



1. A vent closure system for providing outside ventilation to the interior of a building comprising in combination:

(a) a hollow sealed mat having a plurality of horizontal tubular sections formed adjacent to one another and incrementally sealed together by spot seals disposed between the length of each section on alternating sides of the longitudinal axis of each section, and including a plurality of air passages opening internally between each of said spot seals;

(b) means for inflating and deflating mat; and

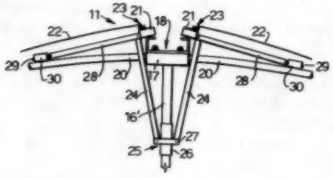
(c) means mountable to an outside wall of said building adjacent a vent opening for supporting said mat in covering relation thereto when inflated and in uncovered relation when deflated.

4,672,889

BUILDING STRUCTURES

Gary M. Lynch, M.S. 1020, Fernvale, Queensland, Australia 4305

Filed Jun. 24, 1985, Ser. No. 747,974
Int. Cl.[4] F24F *7/02*
U.S. Cl. 98—42.2 **7 Claims**



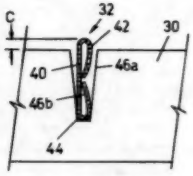
1. A ventilated roof assembly comprising a roof having a central longitudinal gutter support section and a plurality of transversely extending spaced support members, first and second longitudinally extending frame parts disposed over said support members on the respective sides of said gutter support section, said frame parts being pivotally secured along one longitudinal edge to said support members and extending centrally of said roof to have its opposite longitudinal edge in abutment with said central gutter section when resting on said support members, a roof covering of flexible sheet material including first and second portions secured to the respective first and second pivotal frame parts and extending away therefrom over the remainder of said roof and being fixedly secured to the support members and means pivotally interconnecting said covered frames so that said covered frame parts are movable in concert between a first attitude in abutment with said gutter section wherein said roof is substantially closed to inhibit ventilation from said building structure and a second attitude wherein said frame parts are moved away from said gutter section to define an opening in said roof to ventilate said building structure.

4,672,890

LIGHTWEIGHT LOAD BEARING REGISTER

Lloyd G. Dayus, Memphis, Tenn., assignor to Rachels Industries, Inc., Memphis, Tenn.

Filed Jun. 13, 1986, Ser. No. 874,136
Int. Cl.[4] F24F *13/08*
U.S. Cl. 98—114 **10 Claims**



1. A lightweight load bearing register comprising:

a frame of strip sheet metal, formed into a generally L-shaped configuration along its length, said frame being formed in four pieces joined at four corners;

a supporting grid of groups of transverse and longitudinal strips of sheet metal supported at their ends by said frame;

a first one of said groups of said strips being formed of a single thickness of sheet metal, and with a plurality of notches formed therein at spaced intervals;

a second one of said groups of said strips being formed of two thicknesses of sheet metal, having a thickness thinner than one-half of the thickness of said first of said groups, said strips in said second group defining an elongated folded blade-like structure, with two side walls and a hollow interior spacing between said side walls, said spacing being substantially equal to the thickness of the sheet metal of which they are formed, and radiussed bends formed along at least their upper extremity, said second group of strip members being forced into said notches in said first group of strip members, said second group of strip members being squeezed, reducing the spacing between said opposite side walls thereof, and providing a good, tight frictional fit; and wherein said notches have a predetermined depth less than the overall height of said strips in said second group whereby said strips in said second group extend above said strips of said first group.

4,672,891

METHOD OF PRODUCING AN IDENTIFICATION CARD

Thomas Maurer, and Ludwig Devrient, both of Munich, Fed. Rep. of Germany, assignors to GAO Gesellschaft fur Automation und Organisation mbH, Fed. Rep. of Germany

Division of Ser. No. 563,770, Dec. 21, 1983, Pat. No. 4,597,592. This application Mar. 26, 1986, Ser. No. 844,378

Claims priority, application Fed. Rep. of Germany, Dec. 31, 1982, 3248784

Int. Cl.[4] B42D *15/02*

U.S. Cl. 101—32 7 Claims

1. A method of producing identification cards bearing alphanumeric characters, which are present in a high embossed form so as to be employable as a printing block, and further printed information in the form of alphanumeric characters or pictures, characterized by the following steps:

(a) storing in a first memory a data record of the alphanumeric characters for high-embossing,

(b) assigning the card coordinates to each of the characters to be high-embossed,

(c) loading an embossing unit with the data for the characters, defined according to coordinates,

(d) high-embossing a neutral card which may be provided already with magnetic data,

(e) determining the areas of the card to be provided with lasered characters,

(f) loading a laser recorder with the data for the characters, defined according to coordinates,

(g) adapting these data to the requirements as to shape and size to be met by the characters for lasering, and

(h) again inscribing the characters in the areas of the card intended for them, by means of a laser recorder.

4,672,892

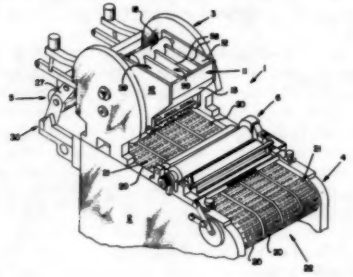
APPARATUS FOR CONVEYING AND MARKING PELLET-SHAPED ARTICLES

E. Michael Ackley, 1273 N. Church St., Moorestown, N.J. 08057

Continuation-in-part of Ser. No. 395,926, Jul. 7, 1982, abandoned, and a continuation-in-part of Ser. No. 544,509, Oct. 24, 1983, Pat. No. 4,528,904. This application May 16, 1985, Ser. No. 734,933

Int. Cl.[4] B41F *17/36*

U.S. Cl. 101—35 40 Claims



1. An apparatus for applying indicia to pellet-shaped articles, comprising:

a feed hopper for containing a plurality of said articles;

drum means operatively associated with said feed hopper, for receiving articles from said feed hopper and for orienting said articles to receive said indicia;

conveyor means operatively associated with said drum means, for receiving said oriented articles from said drum means;

wherein the outer surface of said drum means includes a plurality of article receiving cavities which are radially grouped in circumferential rows spaced along the outer surface of said drum means such that different rows of said drum means are provided with different shaped cavites to receive different shaped articles therein;

wherein said drum means and said conveyor means combine to transport said articles along a transport path; and

first and second printing means operatively associated with said apparatus at different locations along said transport path.

4,672,893

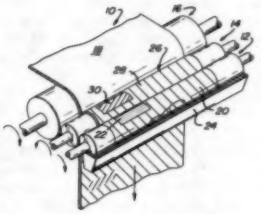
FLEXO-GRAVURE PRINTING

James J. Mammarella, Sr., Hatfield, Pa., assignor to Paramount Packaging, Chalfont, Pa.

Filed Mar. 21, 1985, Ser. No. 714,419

Int. Cl.[4] B41F *9/01, 5/22*

U.S. Cl. 101—170 12 Claims



1. Method of printing a moving substrate, comprising providing a first cylinder having ink receiving cells on its periphery, some of said cells defining an image carrier portion for gravure printing and other of said cells defining an ink metering portion for flexographic printing, supplying ink to said ink receiving cells, providing a second cylinder having a blanket transfer portion for gravure printing and a separate image carrier portion for flexographic printing, transferring ink from said image carrier cells to said second cylinder blanket transfer portion and from said ink metering cells to said second cylinder image carrier portion, and transferring ink from said second cylilnder image carrier and blanket transfer portions to a moving substrate.

4,672,894

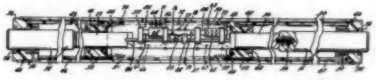
HIGH ROTATIONAL SPEED AUTOREVERSING AXIALLY OSCILLATING INK ROLLER

Philip J. Hardin, 850 Park La., Elm Grove, Wis. 53122

Filed Mar. 3, 1986, Ser. No. 835,231

Int. Cl.[4] B41F *31/14, 31/26;* B41L *27/28*

U.S. Cl. 101—348 9 Claims



1. An ink roller adapted for rotating and oscillating in opposite axial directions comprising:

non-rotating shaft means for being mounted to a printing press,

a cylindrical ink roller journaled for rotating and sliding in opposite axial directions on said shaft,

a generally cylindrical driver member inside of said roller and rotatable therewith and means in said member defining first and second coaxial and adjacent helical grooves surrounding said non-rotating shaft, the twist of the convolutions of one helical groove being opposite of the twist of the other,

support means mounted to said non-rotating shaft and a control shaft mounted for rotation on said support means about an axis parallel to the rotational axis of the ink roller cylinder,

follower members at axially spaced apart locations on said control shaft, each follower member having pairs of diametrically opposite radially extending follower prong means, the prong means on one follower member being angularly displaced about the axis of the rotatable control shaft relative to the other such that the prong means on one follower member will engage with a cooperating helical groove whose convolutions are twisted in one direction while the prong means on the other follower member are disengaged from the oppositely twisted helical groove so that when said roller is driven rotationally the engaged helical groove will turn on the prong means on the other follower member and drive said roller axially in one direction,

means for rotating said control shaft to disengage said prong means on one follower member from a helical groove having one twist when said roller has shifted axially by a predetermined distance and engage the prong means on the other follower member with the groove having the opposite twist so the roller is driven axially in the opposite direction, and the improvement wherein:

said rotatable control shaft is shiftable in axially opposite directions on said support means, between limits,

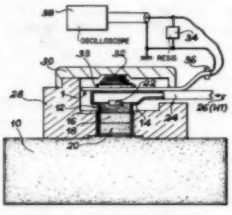
the reactive forces between one helical groove that twists one way and its cooperating follower prong means when said roller is rotating in one direction being such as to cause said control shaft to shift to one limit in the direction opposite to the axial direction in which said roller is being driven such that when said means for rotating said control shaft means rotates said control shaft at the time said roller reaches a predetermined axial limit the other follower prong means engages in the other helical groove that twists opposite to said one way and said other helical groove and roller rotate freely for at least one revolution during which the reactive forces are such as to cause said control shaft to shift until it stops at the other limit before said roller will reverse its axial movement direction.

4,672,895

DEVICE FOR CONTROLLING THE PRIMING OF A PYROTECHNIC DEVICE

Michel Bouchu, Soisy Sous Montmorency, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Mar. 24, 1986, Ser. No. 843,025
Claims priority, application France, Mar. 25, 1985, 85 04402
Int. Cl.[4] F42C *11/00*
U.S. Cl. 102—206 **6 Claims**



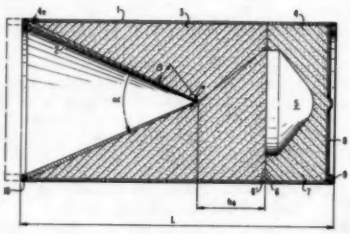
1. A device for controlling the priming of a pyrotechnic device incorporating a detonator that comprises at least one charge and a system for igniting said charge, means for supplying a high voltage electric pulse to the detonator, means for positioning the detonator with respect to an explosive charge and applying same to said charge, wherein a control probe is positioned to the rear of the detonator and is applied against the same, said probe comprising a film having two faces of a biaxially stretched polymer having a polarized zone, an electrode connected to each face of the polarized zone and connection means for connecting each electrode to a measuring device.

4,672,896

HOLLOW CHARGES

Michel Precoul, and Jean S. Peyroux, both of Paris, France, assignors to Societe d'Etudes, de Realisations et d'Applications Techniques, Paris, France

Filed Aug. 21, 1985, Ser. No. 767,974
Claims priority, application France, Aug. 21, 1984, 84 13015
Int. Cl.[4] F42B *11/22, 13/02, 1/00*
U.S. Cl. 102—309 **19 Claims**



1. A hollow charge, comprising:

a casing having a cylindrical shape and extending in an axial direction;

a liner coaxially disposed within said casing, said liner having a conical configuration with a vertex of said liner positioned centrally within said casing, said liner having a progressive thickness between a base thereof and said vertex, said thickness being greater at said base than at said vertex of said liner;

a monoblock subassembly coaxially disposed within said casing and spaced axially further from said base than from said vertex of said liner, said monoblock subassembly including a cylindrical primer block of explosive material and an inverted shield fitted in a recess on a surface of said primer block facing said liner, said inverted shield having a maximum diameter at said surface of said primer block and having an ogival shape extending into part of said primer block; and

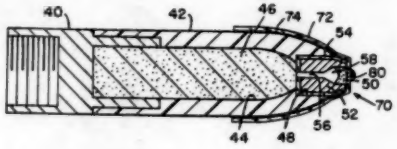
a main explosive charge disposed in said casing between said liner and said monoblock subassembly;

whereby said ogival shield provides a triggering effect assuring preorientation of detonation waves generated by said primer block and an angle of the detonation waves striking said liner can be adjusted by changing the axial distance between said monoblock subassembly and said vertex of said liner.

4,672,897
IMPACTOR CAP

Robert E. Betts, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 5, 1986, Ser. No. 859,599
Int. Cl.[4] F42B 11/16
U.S. Cl. 102—513 2 Claims



1. An impactor-cap device in combination with a percussion primer which functions to indent said percussion primer for initiating an explosive charge carried to a target site bya rocket launched toward a target whereupon striking soft target said percussion primer is set off by said impactor-cap device and the explosion thereof is communicated through a chamber and passage diectly connecting apyrotechnic spotting charge to in turn set off said pyrotechnic spotting charge, said impactor-cap device comprising a cap portion and an impactor portion, said cap portion constructed of a thin plastic cup of a material selected from polyethylene, nylon, polyethylene terephthalate, or cellulose acetate, said thin plastic cup forming a contoured fit with said percussion primer, said impactor portion being retained within said cap portion which precisely orients said impactor portion with said percussion primer, said impactor portion being in the form of a ball of low mass constructed of a material selected from the group of materials consisting of steel, glass, and a high impact strength plastic material selected from the group of high impact strength plastic materials consisting of polycarbonate, methyl methacrylate, and nylon, said impactor being of low mass which does not cause percussion cap initiation even at high G-loading, but upon impacting with a soft target such as mud or soft earth material, the impactor indents said percussion primer with sufficient energy and depth to cause functional performance of said percussion primer after initiation by said impactor-cap device.

4,672,898
MULTI-LOCATION ADJUSTABLE TABLE

Henry A. Davidson, 1818 Port Wheeler, Newport Beach, Calif. 92660

Continuation-in-part of Ser. No. 542,497, Oct. 17, 1983, abandoned. This application Mar. 4, 1986, Ser. No. 835,885
Int. Cl.[4] A47F 5/12; A47B 11/00, 9/00
U.S. Cl. 108—6 4 Claims

1. A bulkhead mounted multi-location adjustable table comprising:

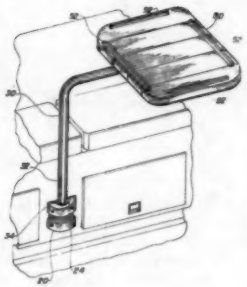
(a) a bulkhead bracket having a cavity therethrough with a plurality of notches on the top periphery and permanent attaching means for securing the bracket to said bulkhead;

(b) a davit shaped arm having a first and second end with a plurality of bores therethrough on each end, slideably penetrating said bulkhead bracket cavity on the first end for angularly supporting weight thereupon;

(c) a plurality of spring loaded detents positioned within said davit shaped arm structure on each end extending from said bores in said arm urged outwardly under the influence of the spring providing a locking structure on said arm first end mating with said bracket notches in a meshing fashion while lifted upward and rotated allowing a portion of said arm to remain partially slideably affixed within the bulkhead bracket cavity for angularly positioning said arm when replaced in said notches;

(d) a separable top attaching bracket having end extending fingers, a round opening therethrough, a "U" shaped mount with a lever clearance hole between the separated ends, and a plurality of aligned holes, said top attaching bracket slideably received by said second end of said arm with said detents penetrating the aligned holes in locking fashion providing an adjustable structural mounting plane;

(e) a table top having a flat surface permanently affixed to said mounting plane of the top attaching bracket with securing means providing a table for placing objects in a convenient location with said top being slideably removable from said arm and the arm slideably removable from said bulkhead bracket providing a storable multi-location table when used in conjunction with more than one permanently mounted bulkhead bracket;



(f) a stabilizer lever rotatably connected through said "U" shaped mount on the top attaching bracket in such a manner as to apply pressure upon said arm mounted within the attaching bracket when rotated parallel with said table top rendering the top stable in relationship with the arm said lever further having a roller sleeve rotatably disposed upon said lever allowing the lever to rotate within the sleeve when the sleeve is contiguously engaged with said arm preventing wear and uncontrolled deformation of the arm; and,

(g) a rotation of 360 degrees of said table top and arm within said bracket, allowing positioning at the interface of said detents within said plurality of notches when nested therein.

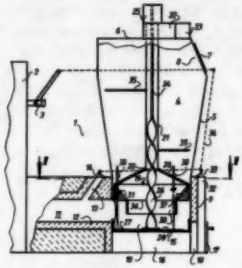
4,672,899
PREBURNING PLANT FOR BURNING SOLID FUEL MATERIALS HAVING A HIGH ASH CONTENTS

Ernst Kainer, A-2832 Thernberg 23, Austria

PCT No. PCT/AT85/00030, § 371 Date May 19, 1986, § 102(e) Date May 19, 1986, PCT Pub. No. WO86/01874, PCT Pub. Date Mar. 27, 1986
PCT Filed Sep. 16, 1985, Ser. No. 876,869
Claims priority, application Austria, Sep. 17, 1984, A2950/84
Int. Cl.[4] F23B 7/00
U.S. Cl. 110—234 22 Claims

1. A combustion equipment for the combustion of solid combustible material of high ash content, comprising a furnace chamber having a grate at its bottom and receiving the combustible material from a storage compartment disposed above said furnace chamber, a mantle of refractory material surrounding said furnace chamber, a combustion channel for connecting said furnace chamber to a boiler means, said combustion channel extending through said mantle and having an opening for supplying secondary air, a further opening in the mantle for supplying primary air below the grate, a gasifier ring near said mantle and above said combustion channel and spaced at a distance above said grate, said gasifier ring having an upright axis and a central opening and a top surface, said top surface being inclined towards said central opening, a worm

means extending in direction towards this opening and a drive means for rotating said gasifier ring around its axis, so that said



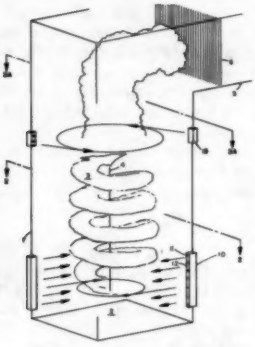
worm means conveys the combustible material through said opening of the gasifier ring.

4,672,900

SYSTEM FOR INJECTING OVERFIRE AIR INTO A TANGENTIALLY-FIRED FURNACE

Richard W. Santalla; Angelos Kokkinos, both of Enfield; Robert J. Collette, Windsor, and Michael S. McCartney, Bloomfield, all of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Mar. 10, 1983, Ser. No. 474,114
Int. Cl.[4] F23D *1/00*; F23K *1/00*
U.S. Cl. 110—264 **2 Claims**



1. A tangentially-fired, pulverized coal-burning furnace, including,

a combustion chamber of substantially square cross section,

pivotable fuel and air nozzles in each corner of the combustion chamber ejecting fuel and air to generate flames relative the centerline of the chamber to form a fireball swirling about the axis of chamber,

an exit from the upper portion of the combustion chamber for the flue gases generated in the combustion chamber.

a convection section connected to the flue gas exit downstream of the combustion chamber, and

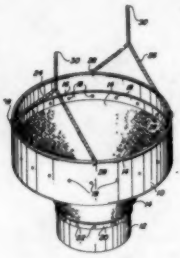
at least one nozzle mounted in the upper portion of the combustion chamber ejecting secondary air in the direction and volume and at the velocity to oppose the swirl of the fireball in its upper portion to produce a uniform nonswirling mass flow of exit gases from the combustion chamber to the flue gas outlet and militate against the formation of NOx.

4,672,901

AUGER HOLE DIRT RETAINER

Joseph P. Stine, 1159 Harbour Island Rd., Orlando, Fla. 32809

Filed Jul. 2, 1985, Ser. No. 751,280
Int. Cl.[4] A01C *5/00*, *13/00*
U.S. Cl. 111—2 **8 Claims**



1. a method for preparing a planting hole comprising the steps of:

(a) providing a variable shape retainer having a first outer cylinder and a second inner cylinder, the inner surface of the outer cylinder being joined to the outer surface of the inner cylinder by a flexible membrane;

(b) placing the retainer on a surface at a location whereby the inner cylinder defines the perimeter of a desired planting hole;

(c) placing an auger bit having an outside diameter approximating the inside diameter of the inner cylinder in a position to drill through the area defined by the inner cylinder;

(d) drilling the planting hole using the auger whereby the earth extracted by the auger is captured between the inner and outer cylinders;

(e) removing the auger from the drilled hole; and

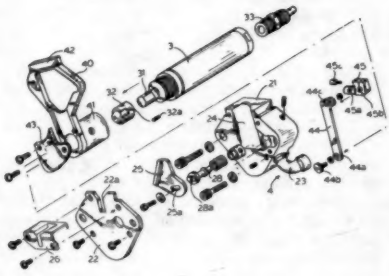
(f) lifting the outer cylinder of the retainer whereby the membrane is stretched such that the container attains a funnel shape to cause the extracted earth to fall back within the hole.

4,672,902

PNEUMATICALLY OPERATED THREAD CUTTER

Sidney Michaels, Fairlawn, N.J., assignor to Clinton Industries, Inc., Carlstadt, N.J.

Filed Jul. 21, 1986, Ser. No. 887,422
Int. Cl.[4] D05B *65/06*
U.S. Cl. 112—287 **4 Claims**



1. A pneumatically operated thread cutter comprising: a cutter housing having a top, a chamber open at the top, a stationary blade connected to the housing and a movable blade mounted in the chamber and coactive with the stationary blade to cut a thread, a pneumatic motor mounted on said housing

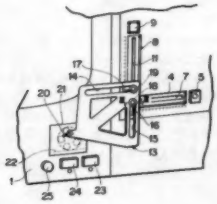
receptive of a supply of air, an eccentric linkage connected to the output of the motor and to the movable blade for moving the blade when the motor rotates, said eccentric linkage including reciprocating means for converting the rotational motion of said pneumatic motor into reciprocating motion, and oscillating means connected between said reciprocating means and said movable blade for converting said reciprocating motion into oscillatory motion of said movable blade.

4,672,903

PATTERN INPUT DEVICE OF A SEWING MACHINE

Kenji Kato, Tokyo, Japan, assignor to Janome Sewing Machine Co., Ltd., Tokyo, Japan

Filed Jul. 10, 1985, Ser. No. 753,671
Claims priority, application Japan, Jul. 10, 1984, 59-141346
Int. Cl.[4] D05B *3/02*
U.S. Cl. 112—457 **6 Claims**



1. In a sewing machine comprising a first memory storing a plurality of different patterns each in a form of stitch control data including data for controlling a needle position and a fabric feed amount, the stitch control data being selectively read out to produce a selected pattern, a second memory for temporarily storing the patterns selected out from the first memory, needle position adjusting means manually operated to optionally adjust a needle position, and feed amount adjusting means manually operated to adjust a feed amount for at least one selected pattern, the improvement comprising:

(a) switching means including an operating key (**12**) operated to make said needle position adjusting means and said feed amount adjusting means responsive to external information;

(b) connector means including a connector member (**13**) for operatively connecting said needle position adjusting means and said feed amount adjusting means to each other, said connector member having an indicating element (**20**) and being manually operated to move said indicating element so as to trade a desired pattern while said needle position adjusting means and said feed amount adjusting means are moved in association with said connector member together with each other or independently from each other;

(c) signal generating means (R_Y, R_X, 6_a, 10_b) activated in association with said needle position adjusting means and said feed amount adjusting means to produce a signal each time said indicating element changes a position thereof; and

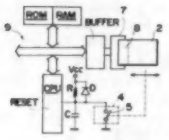
(d) memorizing means including a memorizing key (**23**) operated each time indicating element changes a position thereof to memorize the signal produced by said signal generating means into said second memory.

4,672,904

DEVICE FOR ATTACHING A MEMORY CASSETTE OF A COMPUTERIZED SEWING MACHINE

Kenji Kato, and Shoji Kato, both of Tokyo, Japan, assignors to Janome Sewing Machine Co., Ltd., Tokyo, Japan

Filed Sep. 6, 1985, Ser. No. 774,402
Claims priority, application Japan, Sep. 17, 1984, 59-139440[U]; Sep. 17, 1984, 59-139441[U]
Int. Cl.[4] D05B *3/02*
U.S. Cl. 112—457 **6 Claims**



1. In a sewing machine having a housing, a combination of a computer circuit and a memory cassette, wherein said computer circuit includes at least a central processing unit and a first memory storing pattern data for different stitch patterns to be selectively produced, the computer circuit having a socket positioned in a housing guide groove (**3**) provided in said housing of the sewing machine, and the memory cassette has a cassette body, a second memory storing pattern data for a specific pattern, and a connector which is connected to said socket of the computer circuit by insertion of the memory cassette into said guide groove so as to read out the pattern data of the second memory to thereby produce a specific stitch pattern,

said combination further comprising cam means formed immediately on said cassette body; switch means positioned at said guide groove and normally maintained in an inactivated condition and being activated by said cam means as the memory cassette is inserted into said guide groove; and circuit means connected to said switch means and including a reset circuit which is responsive to the activation of said switch means so as to make the computer circuit inoperative and also to the inactivation of said switch means so as to make said computer circuit operative; said cam means being formed so as to activate said switch means before the connector of said memory cassette is connected to the socket of said computer circuit and to restore said switch means to the inactivated condition after the connector has been connected to said socket, whereby said computer circuit is made inoperative by said circuit means before the memory cassette is connected to or disconnected from the computer circuit and the computer circuit is restored to operation after the memory cassette is connected to or disconnected from the computer circuit.

4,672,905

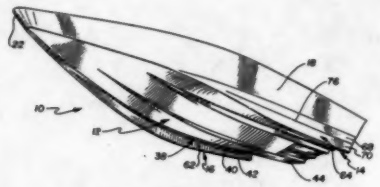
BOAT HULL WITH CENTER V-HULL AND SPONSONS

Howard W. Pipkorn, 1622 Lake Johanna Blvd., Arden Hills, Minn. 55112

Continuation of Ser. No. 675,533, Nov. 28, 1984, abandoned. This application Jun. 6, 1986, Ser. No. 873,267

Int. Cl.[4] B63B *1/04*

U.S. Cl. 114—56 6 Claims



1. A hull for a boat adapted for operation on a water surface, said hull having a bow and a stern, comprising:

a center V-hull portion extending substantially from said bow to said stern, and including a pair of angled panels symmetrically positioned about a hull center plane, said panels defining a V-hull apex line, said angled panels each defining a V-hull dead rise angle measured from said apex line relative to a normal plane containing said apex line and perpendicular to said hull center plane;

first and second opposed sponsons, positioned on opposite sides of said V-hull portion, each sponson including a lower most base;

opposed tunnel top wall surfaces operably connecting said panels with respective ones of said sponsons,

each of said sponson bases being positioned no lower than five degrees above said normal plane as measured from said apex, and no higher than two-thirds of said V-hull portion dead rise angle, whereby said sponson bases remain substantially submerged when said boat attains operational speeds, and said tunnel top wall surfaces being no lower than said V-hull portion dead rise angle whereby said sponsons, said tunnel top wall surfaces, and said V-hull portion, together with said water surface, define a pair of air capturing tunnels while minimizing the wetted surface area of said sponsons.

4,672,906

FREIGHT CARRIER'S HULL CONSTRUCTION FOR CARRYING CRYOGENIC OR HIGH TEMPERATURE FREIGHT

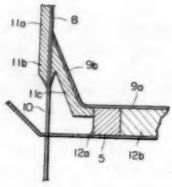
Koetsu Asai, Nagasaki, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 4, 1985, Ser. No. 741,302

Claims priority, application Japan, Jun. 8, 1984, 59-117685; Jun. 8, 1984, 59-117686; Jun. 11, 1984, 59-119623; Jul. 16, 1984, 59-147250; Jul. 18, 1984, 59-149141; Nov. 28, 1984, 59-251404; Dec. 13, 1984, 59-263684

Int. Cl.[4] B63B *25/16*

U.S. Cl. 114—74 A 12 Claims



1. A hull construction of a freight carrying vessel including at least one upright cylindrical storage tank structure with heat-insulation on the outer circumferential surface thereof and having a cylindrical tank bottom plate at a lower end thereof and an upwardly-convex top surface extending from a cylindrical side plate thereof, adapted for storage and transportation of high and/or low temperature freight material, which comprises in combination:

tank bottom insulation means disposed on the bottom part of said hull construction upon which said cylindrical storage tank structure is mounted in position;

tank skirt means extending downwardly from a lower portion of said cylindrical side plate of said cylindrical storage tank structure, said tank skirt means secured at an upper end thereof to said cylindrical storage tank structure and secured at a lower end thereof to said hull construction;

said cylindrical tank bottom plate having a peripheral portion thereof inclined with respect to a central portion thereof with said peripheral portion extending upwardly away from said bottom part of said hull construction and connected to a lower end of said cylindrical side plate;

said cylindrical side plate having an upper end thereof extending substantially above an upper deck surface of said vessel; and

said cylindrical storage tank structure having a diameter equal to or greater than the height thereof.

4,672,907

SAILS

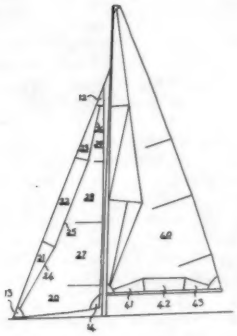
Geoffrey A. Smale, Campbells Bay, New Zealand, assignor to Larnston Limited, London, England

Continuation of Ser. No. 608,423, May 9, 1984, abandoned. This application Mar. 10, 1986, Ser. No. 838,439

Claims priority, application New Zealand, May 16, 1983, 204231; Aug. 17, 1983, 205303; Aug. 17, 1983, 205302

Int. Cl.[4] B63H *9/06*

U.S. Cl. 114—103 11 Claims



1. A sail having a luff edge and a plurality of luff panels in a luff area comprising: two polygonal panels closely approximating a triangular shape and each of which has two long sides and one short side, the projected apex between the two long sides of one said polygonal panel being disposed at the head of the sail and the projected apex between the two long sides of the other said polygonal panel being disposed at the foot of the sail, one of said long sides of each polygonal panel lying on the luff edge of the sail, each polygonal panel having warp or weft threads disposed substantially parallel to the other long side of each polygonal panel; and at least one central panel disposed between and having first and second sides secured to said short sides of said two polygonal panels, said at least one central panel having third and fourth opposite sides with the third side lying on the luff edge of the sail and the warp or weft threads of said at least one central panel being disposed substantially

parallel to the fourth side of said at least one central panel; whereby said two polygonal panels and said at least one central panel together form an interior edge lying substantially on a line corresponding essentially to a line of principle stress exerted on said sail when subjected to wind load and properly tensioned.

4,672,908

HYDRAULIC TENSIONING DEVICE FOR SAILING VESSEL

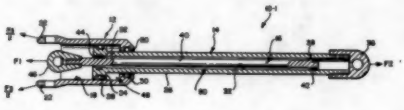
Marinus Goulooze, Industrie Rd., Mossel Bay, South Africa

Filed Sep. 16, 1985, Ser. No. 776,465

Claims priority, application South Africa, Sep. 14, 1984, 84/7280

Int. Cl.[4] B66F *9/22*

U.S. Cl. 114—214 **8 Claims**



1. A hydraulic tensioning device which includes:

a first component defining, internally thereof, a first cylinder and having, at one end thereof, a first end wall;

a second component displaceable piston-and-cylinder fashion with respect to the first component and comprising a first piston co-operating with the first cylinder, and a first piston rod extending axially through the first end wall, there being a fluid-tight seal between the first piston rod and the first end wall, and the second component further defining, internally thereof, a second cylinder coaxial with the first cylinder and having, at one end thereof, a second end wall; and

a third component displaceable piston-and-cylinder fashion with respect to the second component and comprising a second piston co-operating with the second cylinder, and a second piston rod extending axially through the second end wall, there being a fluid-tight seal between the second piston rod and the second end wall;

the space defined axially between the first piston and the first end wall and radially between the first piston rod and the first cylinder being in fluid flow communication with the space defined axially between the second piston and the second end wall and radially between the second piston rod and the second cylinder.

4,672,909

RETRACTABLE CLEAT FOR MARINE VESSEL

Joel M. Sweetsir, Box 53, Ruby, Ak. 99768

Filed Jan. 13, 1986, Ser. No. 817,993

Int. Cl.[4] B63B *21/04*

U.S. Cl. 114—218 **9 Claims**

1. A cleat adapted to be moved between a stored position substantially flush with the deck of a marine vessel and an operative position projecting above the deck, said cleat comprising in combination:

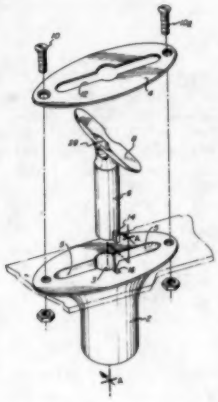
a housing having a substantially cylindrical shape with a substantially circular opening therein;

a detachable cover plate for said housing adapted to be mounted substantially flush with the deck of said vessel and provided with an opening registering with that in said housing;

a cleat member comprising a cleat supported by a stem mounted slidably in said housing;

pin means affixed to and projecting laterally from a lower end of said stem;

a continuous groove in the wall of said cylindrical opening in said housing and adapated to receive said pin means;



said groove defining a pathway travelled by said pin means to allow said cleat member to be moved reversibly between said stored position and said operative position.

4,672,910

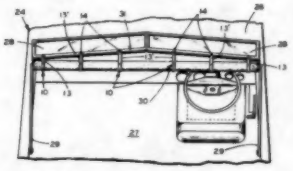
ADJUSTABLE STRAP

Douglas C. Cook, 5600 Cresthaven La., Toledo, Ohio 43614

Filed Oct. 15, 1985, Ser. No. 787,301

Int. Cl.[4] B63B *17/00*

U.S. Cl. 114—361 **2 Claims**



1. A boat having a plurality of snap fasteners positioned generally in aligned relationship with one another to engage cooperating fasteners on a cover for the boat, a roll of the boat cover, in a stowed condition, extending in a direction generally parallel to that in which said snap fasteners extend, and, in combination therewith, a plurality of adjustable straps, each of said straps comprising a ring, a longitudinally extending first strip of fabric, means attaching said fabric strip to said ring with an end and an adjacent length of said strip free of said ring, cooperating means operatively associated with said fabric strip for releasably locking the free end of said fabric strip in each of a plurality of longitudinal positions relative to the adjacent length of said strip which is free of said ring, a snap fastener, a longitudinally extending second strip of fabric, means attaching said snap fastener to said second strip of fabric, and means attaching said second strip of fabric to the length of said first strip of fabric which is free of said ring, whereby, when the free end of said first strip and a part of the adjacent length of said strip which is free of said ring extend through said ring and the free end of said first strip is releasably locked to the adjacent length of said strip which is free of said ring, said first strip forms a loop whose circumference varies, depending on the longitudinal position on said first strip at which the free end thereof is attached thereto, the snap fastener of each of said adjustable straps being engaged with one

of said boat fasteners, and the free end of the first strip of each of said straps being releasably locked to the adjacent length of said strip which is free of said ring, forming a loop which surrounds and supports said roll of the boat cover.

4,672,911

CANOE SEAT AND OAR LOCK UNIT

Lorne H. Hodgins, 566 Cedar Street, Campbell River, British Columbia, Canada V9W 5S5

Filed Nov. 22, 1985, Ser. No. 800,659
Claims priority, application Canada, Sep. 17, 1984, 463371
Int. Cl.[4] B63B *17/00*
U.S. Cl. 114—363 **11 Claims**

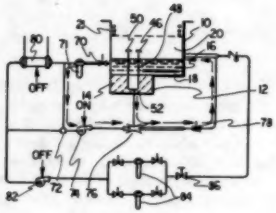
11. A combined seat and rowing device for a canoe comprising a generally U-shaped frame portion having generally L-shaped oar mounting members adjustably mounted thereon and providing upwardly turned outer free ends, an oar lock pivotally mounted on respective ones of the upwardly turned ends, a cross-member interconnecting the legs of the U-shaped frame, a sheet of flexible material extending across said frame and anchored thereto providing a seat for an occupant, and a pair of clamping units slidably mounted on said cross member for attaching the device to the gunnels of a canoe, said U-shaped frame portion and cross-member lying in a common plane.

4,672,912

VAPOR PHASE PROCESSING SYSTEM

Gerard G. Derrico, Maynard, Mass., assignor to Dynapert-HTC Corporation, Farmington, Conn.

Filed Jun. 16, 1986, Ser. No. 874,740
Int. Cl.[4] B05C *11/02*
U.S. Cl. 118—64 **6 Claims**



1. A vapor phase processing system comprising

a vessel for containing a volume of solder with a volume of electronic liquid floating thereon,

heater means for heating the electronic liquid to generate a zone of saturated vapor and to transfer heat to the solder across the interface therebetween,

manifold means communicating with the hot saturated vapor above the electronic liquid and extending downwardly through the electronic liquid into the solder,

means communicating with the bottom of said manifold means for drawing hot saturated vapor above the electronic liquid into said manifold means,

means for conveying work product to the saturated vapor zone, and

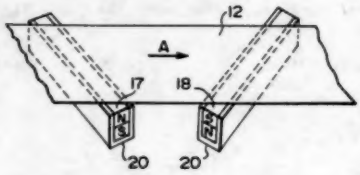
means for applying molten solder contained by said vessel to work product located within the saturated vapor zone.

4,672,913

APPARATUS FOR MAKING MAGNETIC RECORDING MEDIUM

Mikihiko Kato; Shinichi Kato; Kazunori Komatsu, and Shigeo Komine, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Division of Ser. No. 814,989, Dec. 31, 1985. This application May 9, 1986, Ser. No. 861,608
Claims priority, application Japan, Jan. 9, 1985, 60-1952
Int. Cl.[4] B05B *5/02*
U.S. Cl. 118—623 **5 Claims**



1. An apparatus for making a magnetic recording medium, which comprises:

(i) a substrate movement means for continuously moving a strip-like non-magnetic substrate,

(ii) a coating means for applying a magnetic coating composition containing magnetic grains onto said non-magnetic substrate moved by said substrate movement means, and

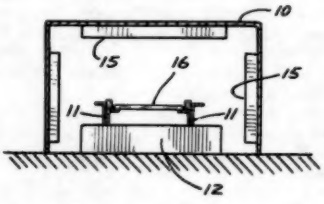
(iii) a plurality of rod-like orientation magnets positioned in spaced relation in the movement direction of said non-magnetic substrate and having a magnetic field act on said magnetic coating composition applied onto said non-magnetic substrate to orientate said magnetic grains randomly before said magnetic coating composition hardens, said orientation magnets being positioned so that the magnetic pole facing said non-magnetic substrate is different between adjacent orientation magnets and said orientation magnets are oblique with respect to said movement direction of said non-magnetic substrate and alternately point in directions opposite to one another, the spaces between said orientation magnets being adjusted so that the intensity of the magnetic field generated in said movement direction of said non-magnetic substrate between adjacent orientation magnets is 50 Oe (oersted) or less.

4,672,914

SYSTEM FOR THE TREATMENT OF EDGE SUPPORTED SUBSTRATES

Eric T. Sari, Plymouth, Minn., assignor to ETS Energy Technology Systems Inc., Plymouth, Minn.

Continuation-in-part of Ser. No. 775,636, Sep. 13, 1985, now Defensive Publication No. 4,643,129. This application Mar. 14, 1986, Ser. No. 840,311
Int. Cl.[4] B05B *5/00*
U.S. Cl. 118—641 **14 Claims**



1. A system for the thermal and liquid treatment of edge supported substrates comprising:

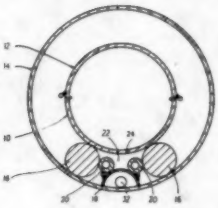
(A) an elongated tunnel treating chamber,
(B) a pair of elongated tracks extending through said chamber,
(C) support members for said tracks outside of said chamber at opposite ends thereof,
(D) a lubricant-free closed loop tape conveyor on each of said tracks, said conveyor having a plurality of longitudinally aligned and longitudinally spaced vertical tabs spaced inwardly from the edges of the tape, said tape being in engagement with the top surface of said tracks, to support a substrate therebetween by its edges, and
(E) means for moving said conveyors along said tracks.

4,672,915

GAS SUPPLY DEVICE, PARTICULARLY FOR MANUFACTURING SEMICONDUCTOR ELEMENTS

George M. Jenkins, 281 Restigouche Road, Oromocto, Province of New Brunswick, Canada E2V 2H2

Filed Nov. 29, 1985, Ser. No. 802,732
Claims priority, application Canada, Nov. 30, 1984, 469124
Int. Cl.[4] B05C *13/02*
U.S. Cl. 118—124 **9 Claims**



1. A device for supplying gas to a vessel having a plurality of apertures in its wall, the device comprising:
at least one tubular gas manifold positioned outside and along the vessel and having a plurality of apertures being in fluid communication with the apertures of the vessel;
elevating means for positioning the apertures in the manifold or manifolds relatively close to the apertured wall of the vessel; and
two longitudinal support members for supporting the vessel, disposed on the outside of the manifold or manifolds parallel thereto, the support members abutting the vessel and the manifold essentially along their working length, whereby a longitudinal cavity is defined at least by the perforated wall of the vessel, the manifold or manifolds and the support members.

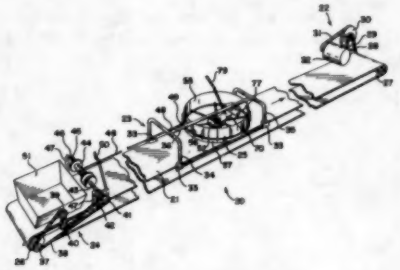
4,672,916

BELT FEEDER APPARATUS WITH A ROTARY DIVERTER ASSEMBLY

Glenn M. Steiner, Orrville, Ohio, assignor to Sevenson Company, Orrville, Ohio

Filed May 25, 1984, Ser. No. 614,062
Int. Cl.[4] A01K *5/00*
U.S. Cl. 119—52 B **2 Claims**

1. A delivery apparaus for livestock feed comprising: a moving endless belt for carrying feed from a supply source toward feeding positions at either side of said belt, a carriage movable along a substantial portion of said belt and having stanchion members projecting upwardly above said belt and innerconnected by a central member, a drive means for selectively moving said carriage along said belt, and a rotatable diverter assembly suspended from said carriage central member and maintained in pressure contact with said moving belt for discharging feed thereon to a side thereof;
said rotary diverter assembly including a hub member having an upwardly directed axle shaft and adapted for carrying an annular ring in contact with said moving belt, an articulated axle shaft mounting member extended laterally from said carriage central member, and means to position said axle shaft mounting member with said annular ring in pressure contact with one side of said moving belt;



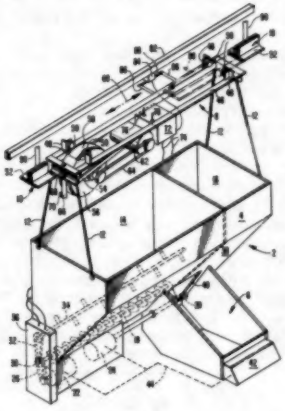
said hub member carrying a rigid annular ring with a series of radially outwardly directed feed paddles thereon, and, below said feed paddles, said rigid ring carries a resilient annular ring for frictional contact with the upper surface of said moving belt.

4,672,917

FEEDER

Harvey Z. Fox, Rte. 2, Box 726, Colby, Wis. 54421

Filed Feb. 26, 1985, Ser. No. 706,261
Int. Cl.[4] A01K *5/02*
U.S. Cl. 119—52 AF **14 Claims**



11. Apparatus for feeding a plurality of animals comprising movable feeder means for automatically dispensing feed for each of said animals sequentially, movable trolley means supporting said movable feeder means, track means supporting said movable trolley means and for guiding said movable trolley means along a path, said trolley means comprising drive means for driving said movable trolley means along said track means, said drive means comprising adjustable slipping means engaging said track means for allowing said trolley means to be stopped when said drive means is activated and said trolley means or said feeder means engages an obstacle and further comprising means for sensing the engagement of said feeder means with an obstacle and for reversing the direction of said trolley means in response to said sensing.

4,672,918

CIRCULATING FLUIDIZED BED REACTOR TEMPERATURE CONTROL

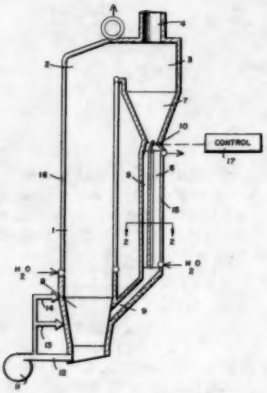
Folke Engstrom, Karhula, Finland, and Juha Sarkki, San Diego, Calif., assignors to A. Ahlstrom Corporation, Karhula, Finland

Filed May 16, 1985, Ser. No. 734,716

Claims priority, application Finland, May 25, 1984, 842098; Apr. 1, 1985, 851296

Int. Cl.[4] F22B *1/00*

U.S. Cl. 122—4 D **15 Claims**



1. A method of controlling the temperature in the combustion chamber of a fluidized bed reactor which emits off-gases having particulate solids therein, to keep the temperature within a desired temperature range, comprising the steps of continuously:

(a) separating the solids from the off-gases;

(b) controlling the temperature of the separated solids;

(c) returning the temperature controlled solids from step (b) to the combustion chamber; and

(d) practicing steps (b) and (c): so that the temperature of the returned solids contribute to the heat content within the combustion chamber in such a way as to maintain it within said desired temperature range; by providing a plurality of solids return conduits; positively cooling the solids in at least one of the plurality of return conduits; controlling the flow of solids through selected return conduits back to the combustion chamber; so that the mass of the returned solids is also controlled, and by cooling solids passing through each of the return conduits, and selectively blocking off the flow of solids through one or more of the conduits to control the temperature of the solids being discharged from the conduits through which the solids flow.

4,672,919

DIRECT POWER VENTED WATER HEATER

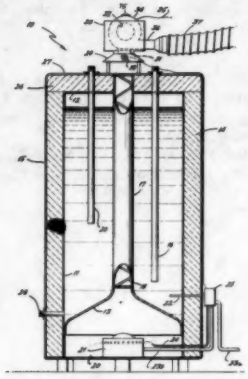
Charles W. Staats, Yeadon, Pa., assignor to Bradford-White Corporation, Philadelphia, Pa.

Filed Jun. 7, 1985, Ser. No. 742,605

Int. Cl.[4] F22B *5/00*

U.S. Cl. 122—13 R **8 Claims**

1. A through-the-wall water heater for installation in a building having a wall, without requiring the use of a chimney for exhaust gases, said heater having an insulated single piece water tank with a cold water inlet line, a hot water outlet line and a baffled flue pipe extending vertically through the tank, said flue pipe opening at its lower end upon a combustion chamber located beneath the tank, said combustion chamber containing a fuel burner, and said flue pipe opening at its other end upon a flue gas collection means whereby the flue gas travels upwardly toward the top of the tank and exits at the top, said collection means comprising a collection chamber positioned above the tank, said collection chamber being provided with a blower and having a draft hood between said flue pipe and said collection chamber, said collection chamber being in fluid communication through the wall of said building and being provided with a flue gas exhaust line for conveying the flue gases through the exchaust line to a direct through-the-wall vent having a conduit for conveying the flue gases from the flue gas exhaust line through the wall and having a stationary face plate which blocks direct access to the vent, control



means connected to said burner and effective for sensing the temperature of the water in the tank and controlling the amount of fuel supplied to the burner in response thereto, the control means being connected to said blower to activate the blower and thereby exhaust the combustion flue gases through said wall of said building when fuel is being supplied to the bruner, and to deactivate the blower when no fuel is being supplied to the burner, said control means including means for sensing when the flue gas exhaust line is blocked and for interrupting the fuel supplied to the burner in response thereto.

4,672,920

PRESSURE COMPENSATED TEMPERATURE SWITCH UNIT FOR PROTECTION OF AN INTERNAL COMBUSTION ENGINE

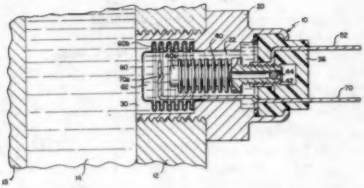
Wayne R. Duprez, c/o Standard-Thomson Corporation, 152 Grove St., Waltham, Mass. 02254-9109

Continuation-in-part of Ser. No. 680,279, Dec. 10, 1984, Pat. No. 4,587,931. This application Jan. 17, 1986, Ser. No. 819,721

The portion of the term of this patent subsequent to May 13, 2003, has been disclaimed.

Int. Cl.[4] F01P *11/16*

U.S. Cl. 123—41.15 **13 Claims**



1. An engine protective switch unit adapted to be mounted in a coolant system of an internal combustion engine for operation of an engine protective monitoring device, the coolant system having a flow passage through which coolant liquid flows, comprising a housing provided with a cavity therein, the housing having an opening which provides communication between the flow passage of the coolant system and the cavity within the housing, pressure responsive means within the cav-

ity of the housing and having a movable portion which is subject to pressure within the cavity, the movable portion of the pressure responsive means having an electrically conductive part, an electrical engagement member adjacent the movable portion of the pressure responsive means and engageable by the electrically conductive part with movement of the movable portion of the pressure responsive means, vaporizable liquid within the pressure responsive means, the vaporizable liquid being heated by the coolant liquid and vaporizable to apply internal pressure upon the movable portion of the pressure responsive means for movement of the movable portion of the pressure responsive means, the electrically conductive part of the movable portion of the pressure responsive means being movable into engagement with the electrical engagement member by vapor pressure within the pressure responsive means which forces movement of the movable portion of the pressure responsive means.

4,672,921

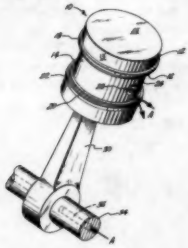
COMPRESSION RETAINING PISTON

Angelo V. Quaglino, Jr., 3220 Palmisano Blvd., Chalmette, La. 70043

Continuation of Ser. No. 599,231, Apr. 11, 1984, abandoned. This application Dec. 9, 1985, Ser. No. 806,648

Int. Cl.[4] F01P *3/10*

U.S. Cl. 123—41.38 **4 Claims**



1. A piston apparatus for maintaining compression between the piston wall and the cylinder wall, comprising:

a. a generally cylindrical piston body, including:

i. a head portion defining the forward end of said body; and

ii. a continuous side wall portion extending rearward from said head portion;

b. means for lubricating and preventing compression loss between said side wall portion and said cylinder wall, including an annular recessed area in said continuous side wall portion for receiving a quantity of fluid lubricant in fluid engagement between the wall of said recessed and the wall of said cylinder;

c. first and second resilient, elastomeric, heat resistant rings positioned in grooves along the wall of the continuous side wall portion, above and below the annular recessed area, each ring engaging the cylinder wall, to reduce loss of lubricant within the recessed area during operation of the piston;

d. first pump means for providing fluid lubricant to engine components other than the pistons; and

e. second pump means for providing fluid lubricant to said recessed area in said continuous side wall portion of said piston, said first and second pump means obtaining lubricant from a common source, and said second pump means including a flow line supplying oil from a predetermined level above the level of oil provided to said first pump means, so that should the oil level to the second pump means fall below the said predetermined level, the loss of oil to said recessed area in said continuous side wall portion of said piston would result in loss of compression and shut down of the engine.

4,672,922

AIR-COOLED OVERHEAD-VALVE ENGINE

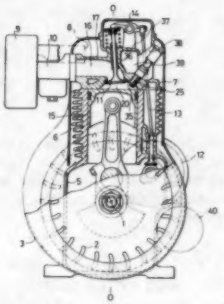
Tetsuaki Shirai, Kobe, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Mar. 11, 1986, Ser. No. 838,578

Claims priority, application Japan, Mar. 13, 1985, 60-51332

Int. Cl.[4] F01P *1/02*

U.S. Cl. 123—41.66 **4 Claims**



1. In an air-cooled overhead-valve internal combustion engine, said engine being composed of a crankcase with a crankshaft, a cylinder block with a cylinder head and a combustion chamber mounted in said crankcase, at least a pair of intake and exhaust valves installed in intake and exhaust ports formed in said cylinder head, a valve drive system mounted adjacent to said cylinder block for driving said intake and exhaust valves through cam-driven push rods, an intake pipe connected at one end thereof to said intake port and at its opposite end to an air cleaner and a carburetor, an exhaust duct connected at one end thereof to said exhaust port, a flywheel joined to said crankshaft at the other end of the output side end of said crankshaft and a cooling fan mounted on said flywheel, the improvements wherein said cooling fan is housed, together with said crankcase and flywheel, in a fan casing having a pair of inlet and outlet openings bored in opposite walls thereof, said inlet opening is located at the flywheel side of said crankshaft, while said outlet opening is located at the opposite side of said crankshaft from said flywheel, and said cam-driven push rods are located in said crankcase on that side of said cylinder block far remote from where said intake pipe is connected to said intake port, said cooling fan being mounted in said fan casing in such a manner that the cooling air from said cooling fan is allowed to flow in a direction substantially parallel with the axis of said crankshaft, along the surface of said cylinder block and cylinder head.

4,672,923

INTERNAL COMBUSTION ENGINE WITH AT LEAST TWO LIQUID COOLED CYLINDERS

Jürgen Wahnschaffe, Bergisch Gladbach; Ernst-Siegfried Hartmann, Rosrath; Karl-Josef Casper; Achim zur Nieden, both of Cologne, and Herbert Schleiermacher, Bruehl, all of Fed. Rep. of Germany, assignors to Kloeckner-Humboldt-Deutz AG, Fed. Rep. of Germany

Filed Mar. 28, 1986, Ser. No. 845,607

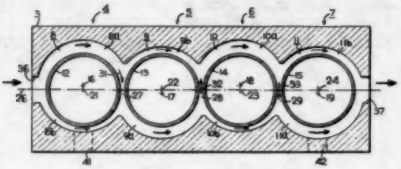
Claims priority, application Fed. Rep. of Germany, Apr. 3, 1985, 3512104

Int. Cl.[4] F01P *3/02*

U.S. Cl. 123—41.74 **19 Claims**

1. An internal combustion engine with an engine block having at least two adjacent liquid cooled cylinders spaced from one another in the direction of the longitudinal central plane of the engine, each cylinder having a cylinder pipe surrounded by an annular cooling chamber, the cooling chamber of one of the cylinders being connected to the cooling chamber

of the other cylinder by way of a coolant crossover passage between said cylinder pipes, a coolant inlet passage connected to one of said chambers, a coolant outlet passage connected to the other of said chambers, the cross sectional flow area of one



cooling chamber being greater on one lateral side of said engine block than on the other lateral side thereof, and the cross sectional flow area of the other cooling chamber being less on said one lateral side of said engine block than on said other lateral side thereof.

4,672,924

TWO-CYCLE ENGINE

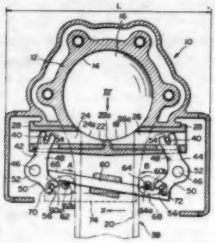
Toshikazu Hiasa, Miyoshimachi, and Hiroyuki Uchida, Oimachi, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Japan

Filed Mar. 17, 1986, Ser. No. 840,313

Claims priority, application Japan, Mar. 26, 1985, 60-61604; Mar. 26, 1985, 60-43673

Int. Cl.[4] F02B *75/02*

U.S. Cl. 123—65 PE **8 Claims**



1. A two-cycle engine comprising:

(a) a cylinder block including a cylinder having an axis, and an exhaust port formed in a side wall of said cylinder;

(b) a piston received in said cylinder for reciprocal movement along the axis of said cylinder for closing and opening said exhaust port; and

(c) port timing control means for varying a timing of the opening of said exhaust port by said piston, said port timing control means comprising (i) a pair of first and second valves movable along respective straight paths disposed generally perpendicular to the axis of said cylinder into and out of respective closed positions where said first and second valves cooperate with each other to close part of said exhaust port; (ii) power transmission means; and (iii) drive means for driving said first and second valves to move into and out of their respective closed positions in accordance with a speed of said engine through said power transmission means;

(d) said power transmission means comprising (i) a pair of first and second shafts mounted on said cylinder block for angular movement about their respective axes disposed generally parallel to the axis of said cylinder, each of said shafts having a pinion portion; (ii) a rack rod disposed generally perpendicular to said shafts and being movable along an axis thereof, said rack rod having a pair of first and second rack portions spaced along the length thereof and meshingly engaging said pinion portions of said first and second shafts, respectively, in such a manner that the angular movement of said first shaft causes the angular movement of said second shaft through said rack rod; (iii) a pair of first and second levers of a generally L-shape defined by a pair of a first arm and a second arm extending generally perpendicularly from said first arm, each of said levers having a corner portion where said first and second arms merge, each lever being angularly movable about an axis passing through said corner portion and disposed generally parallel to said shafts, said first and second arms of each lever being engaged respectively with a respective one of said first and second valves and a respective one of said first and second shafts in such a manner that the angular movements of said first and second shafts cause the angular movements of said first and second levers, respectively, to move said first and second valves into and out of their closed positions, and said first shaft being operatively connected to said drive means for being driven for angular movement.

4,672,925

TWO-CYCLE ENGINE

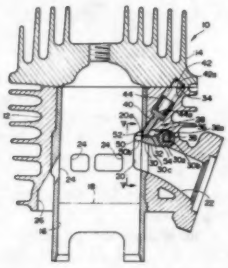
Takahide Miyata, Kawagoe; Kanau Iwashita, Sakado; Kazuman Taniuchi, Fujisawa; Hitoshi Yamamoto, Shiki, and Katsuhiro Nakamichi, Asaka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Japan

Filed Mar. 7, 1986, Ser. No. 837,416

Claims priority, application Japan, Mar. 9, 1985, 60-47291; Aug. 2, 1985, 60-119668; Aug. 28, 1985, 60-131224; Sep. 25, 1985, 60-211918

Int. Cl.[4] F02B *75/02*

U.S. Cl. 123—65 PE **11 Claims**



1. A two-cycle engine comprising:

(a) a cylinder block having a cylinder head thereon, said cylinder block having a cylinder having an axis, an exhaust port being formed in a side wall of said cylinder and having opposite ends spaced along the axis of said cylinder, and said cylinder block having an exhaust passage communicating with said exhaust port;

(b) a piston received in said cylinder for reciprocal movement along the axis of said cylinder for closing and opening said exhaust port; and

(c) port timing control means for varying a timing of the opening of said exhaust port by said piston, said port timing control means comprising (i) a first valve mounted within said exhaust passage adjacent to one end of said exhaust port closer to said cylinder head and having a port timing control surface, (ii) a second valve mounted on said cylinder block between said cylinder head and said first valve and having a closure surface, and (iii) urging means acting on said second valve to always urge it against said first valve, said first valve being operable to be angularly moved about an axis generally perpendicular to the axis of

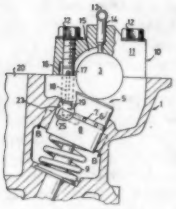
said cylinder into and out of an extended position where said control surface is disposed slightly below said one end of said exhaust port to close a part of said exhaust port, said second valve being movable along a generally straight path into and out of an extended position where said closure surface closes that portion of said exhaust port lying between said one end of said exhaust port and said first valve, said second valve being movable in synchronism with the angular movement of said first valve through said urging means.

4,672,926

ARRANGEMENT FOR HYDRAULIC PRESSURE FEED IN INTERNAL COMBUSTION ENGINES

Bengt G. Gadefelt, Södertälje, and Lars E. Bergsten, Järna, both of Sweden, assignors to Saab-Scania Aktiebolag, Sodertalje, Sweden

Filed Jan. 18, 1984, Ser. No. 571,797
Claims priority, application Sweden, Jan. 20, 1983, 8300282
Int. Cl.⁴ F01L *1/24*
U.S. Cl. 123—90.34 **9 Claims**



2. An arrangement for hydraulic pressure feed to self-adjusting hydraulic valve pushers in an overhead cam engine having a plurality of valves within a cylinder head, each valve being atuated by a valve pusher reciprocatingly suported in the cylinder head above the valve, a rotatably mounted cam shaft supported by a plurality of bearings in the cylinder head for actuating the valve pushers, the hydraulic pressure feed comprising a distribution conduit extending the length of the cylinder head, a plurality of branch conduits leading from the distribution conduit to the cam shaft bearings, a conduit leading from a cam shaft bearing to a second pocket contiguous to the bearings of two valve pushers, the cam shaft bearing being provided with a first pocket to receive fluid from the distribution conduit, the first pocket being in communication with the distribution conduit and the conduit leading to the two valve pushers, said conduit comprising a passage in a screw and a bore for mounting the screw, said screw fastening a bearing cap of said cam shaft bearing whereby hydraulic fluid is supplied to the valve pusher.

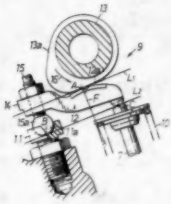
4,672,927

VALVE ACTUATOR FOR INTERNAL COMBUSTION ENGINE

Takanao Uchida, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 27, 1985, Ser. No. 749,553
Claims priority, application Japan, Jun. 29, 1984, 59-134832
Int. Cl.⁴ F01L *1/18*
U.S. Cl. 123—90.44 **2 Claims**

1. A valve actuating mechanism for an overhead valve and overhead cam type internal combustion engine in which the camshaft is positioned above and between the valve and a cam follower seat member in a cylinder head of the engine, comprising, the cam follower seat member being threadedly mounted in the cylinder head and having a semi-spherical recess facing upwardly, a cam follower having an adjustable bolt threadedly received in one end of said cam follower, said adjustable bolt having a spherical fulcrum engaging the semi-spherical recess of the seat member, said cam follower also having a downwardly facing means on the other end for engaging the valve and an upwardly facing slipper face for sliding engagement with a cam on the camshaft, said cam being adapted to rotate across the slipper face in the direction of the valve, said slipper face having a surface shape for engaging the



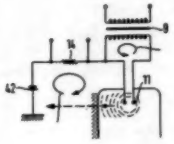
cam at the start of valve-lifting movement of said cam follower at a point through which a line tangent to said slipper face is substantially parallel to a line through contact points between said cam follower and the seat member and valve for minimizing the lateral forces imposed on said cam follower by the cam at the start of the valve-lifting movement.

4,672,928

IGNITION DEVICE FOR INTERNAL COMBUSTION ENGINES

Gunter Hartig, Karlsruhe, Fed. Rep. of Germany, assignor to Pierburg GmbH & Co KG, Neuss, Fed. Rep. of Germany

Filed Nov. 20, 1984, Ser. No. 673,525
Claims priority, application Fed. Rep. of Germany, Nov. 25, 1983, 3342723
Int. Cl.⁴ F02P *3/06*
U.S. Cl. 123—143 B **9 Claims**



1. Ignition device for internal combustion engines comprising:

at least one spark gap with two ignition electrodes for creating ignition sparks between them in a combustion chamber of said internal combustion engine, neither of the two ignition electrodes being connected to ground potential of an internal combustion engine; and an ignition current source which is connected to the ignition electrodes, said ignition current source and said ignition electrodes forming an ignition circuit insulated from ground, with the current of said ignition circuit flowing within said combustion chamber between said two ignition electrodes and creating an ignition spark for inflaming an air-fuel mixture within said combustion chamber; and

a plasma detection circuit for detecting the flame velocity of said inflamed air-fuel mixture by generating a current through the plasma of said inflamed air-fuel mixture, said current being generated externally of said spark gap, said plasma detection circuit comprises:

(a) a current path through said plasma extending between a wall of said combustion chamber and at least one of said ignition electrodes;

(b) a voltage source having one terminal coupled through

ground to said wall of said combustion chamber, with the other terminal of said voltage source being coupled to said at least one ignition electrode; and

(c) means for delivering an output pulse corresponding to the intensity and the time pattern of a current in said plasma detection circuit, wherein said output pulse occurs when said flame has travelled over the distance between said at least one ignition electrode and said wall of said combustion chamber.

4,672,929

AUTOMATIC STARTING ARRANGEMENT FOR AN INTERNAL COMBUSTION ENGINE

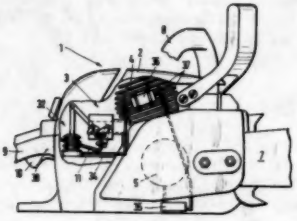
Michael Wissmann, Schorndorf-Weiler; Hans Nickel, Cottenweiler, and Jürgen Weber, Waiblingen, all of Fed. Rep. of Germany, assignors to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

Filed Dec. 13, 1985, Ser. No. 809,013

Claims priority, application Fed. Rep. of Germany, Dec. 15, 1984, 3445839

Int. Cl.[4] F02M *1/10*

U.S. Cl. 123—179 G **17 Claims**



1. An automatic starting arrangement for an internal combustion engine such as the manually startable engine of a chain saw equipped with a carburetor defining an intake channel through which air flows to the engine, the engine having a crankcase wherein underpressure develops during the operation thereof, the arrangement comprising:

a choke flap movably mounted in the intake channel so as to be movable from a start position to a no-choke at-rest position;

first resilient biasing means for resiliently biasing said choke flap into said start position;

a throttle flap mounted in the intake channel so as to be movable between a first position corresponding to the idle running condition of the engine and a second position corresponding to the full-throttle running condition of the engine;

manually operable throttle lever means connected to said throttle flap for actuating the same;

second resilient biasing means for resiliently biasing said throttle flap toward said first position;

said flaps being mounted one behind the other when viewed in the direction of air flow to the engine;

coupling means for position-dependently coupling said flaps together so as to cause said choke flap to hold said throttle flap against the force of said second resilient biasing means in a predetermined position between said first and second positions thereof when said choke flap is in said start position;

actuating means for moving said choke flap into said at-rest position in response to said underpressure; and,

said coupling means including decoupling means for decoupling said throttle flap from said choke flap when the latter is in said at-rest position so as to permit said throttle flap to be adjustable by said throttle lever means independently of the position of said choke flap.

4,672,930

DECOMPRESSION APPARATUS FOR ENGINES

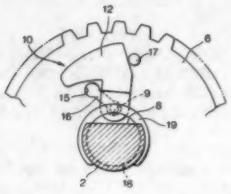
Kiyohide Sumi, Koga, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 21, 1986, Ser. No. 855,192

Claims priority, application Japan, Apr. 25, 1985, 60-62345[U]

Int. Cl.[4] F01L *13/08*

U.S. Cl. 123—182 **3 Claims**



1. In a decompression apparatus for an engine having a camshaft, a cam gear formed on the camshaft, and a tappet engaging with a cam on the camshaft, the improvement comprising;

a releasing lever comprising a shaft and a weight secured to the shaft,

the shaft having a large diameter portion to which the weight is secured, reduced portion formed in the large diameter portion, small diameter portion adjacent the reduced portion, flat reduced portion formed in an end portion of the small diameter portion;

the cam gear having a first hole in which the large diameter portion is rotatably mounted, second hole in which the reduced portion and small diameter portion can be inserted, slit connecting both the first and second holes and having a width for allowing the reduced portion of the large diameter portion to pass the slit; and

means for fixing the releasing lever to the cam gear so as to prevent the axial movement of the releasing lever,

the flat reduced portion being arranged to locate below the periphery of the cam at the stop of the engine operation.

4,672,931

LUBRICATION SYSTEM WITH OIL RECOVERY FOR A TWO-STROKE ENGINE PISTON WITH PUMP-SUMP FOR SCAVENGING

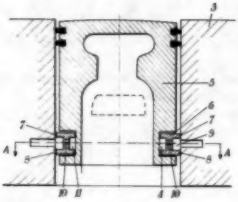
Livio Biagini, Bologna, Italy, assignor to B-Art S.a.s., Bologna, Italy

Filed Jun. 2, 1986, Ser. No. 870,096

Claims priority, application Italy, Jun. 4, 1985, 48165 A/85

Int. Cl.[4] F02F *75/06*

U.S. Cl. 123—193 P **6 Claims**



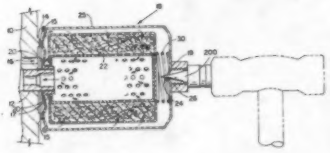
1. A lubrication system with oil recovery for a two-stroke engine piston with pump-sump for scavenging, said lubrication system consisting of a lubricating oil forced circulation system having inlet and outlet holes for the lubricating oil which are obtained through the wall of the cylinder, and also consisting of shaped scraper rings housed each within a circular seat

obtained on the piston skirt which do not communicate with the inside of the same, said circular seats being provided on the piston skirt at such a height as not to allow any overlapping of said scraper rings with the transfer ports of the two-stroke engine.

4,672,932
FULL-FLOW FILTER FOR INTERNAL COMBUSTION ENGINE, ADAPTABLE FOR USE WITH A BY-PASS FILTER

Donald R. Schmidt, San Antonio, Tex., assignor to Encon Systems, Ltd., San Antonio, Tex.

Filed Oct. 7, 1986, Ser. No. 916,194
Int. Cl.[4] F01M *1/00*
U.S. Cl. 123—196 A **9 Claims**



1. Filter apparatus for an internal combustion engine to replace a spin-on, full-flow oil filter threadably connected to an oil filter bushing, said engine having an oil system with an oil pump and having an oil pan and an oil cap at a low pressure side of the oil system, said apparatus comprising:

a full-flow filter to be connected to said oil filter bushing to permit oil within said oil system to flow into said full-flow filter, said full-flow filter being of such density and filtering capacity that said oil flows from said oil pump through said full-flow filter with a minimum pressure drop;

adapter means to permit use of the full-flow filter either with or without a by-pass filter, said adapter means being a nut located at the forward end of said full-flow filter opposite said oil filter bushing and extending outwardly, said nut defining an area that can be either left intact, thereby permitting all of said oil to flow outward from said full-flow filter after filtering, or punctured, thereby permitting most of said oil to flow outward from the full-flow filter after filtering and a small portion of said oil to flow outward therefrom prior to filtering, said nut being within a specific range of depth and circumference so as to provide a means for controlling the size of said hole, and said nut being inwardly threaded.

4,672,933
PRECOMBUSTION CHAMBER WITH INSULATING MEANS

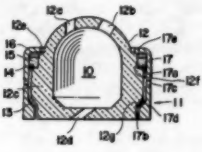
Masato Taniguchi, Nagoya; Hisaharu Nishio, Tokai; Mitsuyoshi Kawamura, Aichi, and Toshio Okumura, Kakamigahara, all of Japan, assignors to 501 NGK Spark Plug Co. Ltd., Aichi, Japan

Filed Oct. 25, 1985, Ser. No. 791,542
Claims priority, application Japan, Oct. 30, 1984, 59-229697; Oct. 30, 1984, 59-229698
Int. Cl.[4] F02B *19/16*
U.S. Cl. 123—270 **16 Claims**

1. A precombustion chamber provided with an arrangement for thermally insulating a cylinder head of an internal combustion engine from a combustion gas in the precombustion chamber, comprising:

(a) a hollow ceramic body which provides a precombustion chamber and is disposed within a hollow space within the engine for the precombustion chamber, the hollow ceramic body being provided with a protruding collar portion having an enlarged diameter along the periphery thereof to form a pair of shoulders;

(b) a hollow metallic fitting member disposed around the hollow ceramic body within the hollow space for mitigating and absorbing the stress produced between the cylinder head and the hollow ceramic body, said fitting being secured to the collar portion of the ceramic body leaving



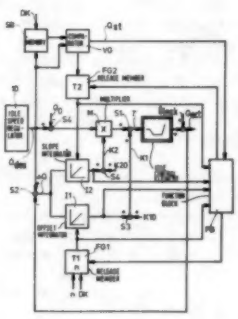
a clearance between the ceramic body and the fitting member; and

(c) seal means for sealing said clearance to provide a closed space therebetween, the seal means being secured between said shoulders and the fitting member.

4,672,934
METHOD AND APPAPATUS FOR ADAPTING THE CHARACTERISTIC OF A FINAL CONTROLLING ELEMENT

Cornelius Peter, and Claus Ruppmann, both of Stuttgart, Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 650,812, Sep. 14, 1984, Pat. No. 4,567,869. This application Apr. 22, 1985, Ser. No. 725,392
Claims priority, application Fed. Rep. of Germany, Sep. 21, 1983, 3334062; Apr. 21, 1984, 3415183
The portion of the term of this patent subsequent to Feb. 4, 2003, has been disclaimed.
Int. Cl.[4] F02D *41/16*
U.S. Cl. 123—339 **6 Claims**



1. Method of adapting a characteristic of a final controlling element to eliminate disturbances and other undesired quantities acting thereon, the method being applicable to apparatus such as an internal combustion engine having an idle air charge control arrangement equipped with an idle control element, the method being especially for adapting the characteristic of said idle control element, the arrangement controlling the quantity of air delivered to the engine during the idle mode of operation and including an idle speed regulator for supplying a desired value $\dot{Q}_{des}$ of air quantity and said idle control element, the method comprising the steps of:

transforming the desired output value ($\dot{Q}_{des}$, $\dot{m}_{des}$) of the idle speed regulator supplied to the idle control element into an adapted electrical control quantity (τ) for said idle control element by means of regulation that takes into account actual value output ($\dot{Q}_{act}$, $\dot{m}_{act}$) which at least

partially depends upon the instantaneous actual position of the idle control element; and,

said transformation including the step of arithmetically combining said desired output value with the output of at least one of two integrator means influencing the offset and the slope, respectively, of the characteristic of said idle control element;

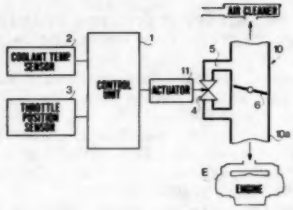
the integrator means for influencing offset always being released when: the throttle valve is closed; said integrator means for slope adaptation is not released; and, a predetermined blocking period T_2 has expired.

4,672,935

INTAKE AIR CONTROL SYSTEM FOR AN AUTOMOTIVE ENGINE

Kunihiro Abe, Higashimurayama, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 21, 1985, Ser. No. 789,877
Claims priority, application Japan, Oct. 26, 1984, 59-226256
Int. Cl.[4] F02D 9/02
U.S. Cl. 123—339 10 Claims



1. A system for controlling intake air in an automotive engine having an intake passage through which an air-fuel mixture passes, a throttle valve in the intake passage, and a bypass bypassing the throttle valve, comprising:

a control valve provided in the bypass to control the amount of bypassing air;

actuating means for operating the control valve;

first means for detecting a maximum opening of the throttle valve during a period from opening to closing of the throttle valve and for producing a first throttle position signal dependent on the value of the maximum opening of the throttle valve, and for producing a second throttle position signal when the throttle valve is closed to an idle position, respectively;

said first means responsive to the first throttle position signal for determining an opening degree of the control valve in dependency on the value of said maximum opening of the throttle valve, and for operating the actuating means to open the control valve to said opening degree of the control valve; and

said first means responsive to the second throttle position signal for operating the actuating means for gradually closing the control valve from said opening degree of the control valve, whereby excessive enrichment of the air-fuel mixture is prevented during a rapid closing of the throttle valve.

7. A method for controlling the intake air in an automotive engine having an intake passage, a throttle valve in the intake passage, a bypass bypassing the throttle valve, a control valve in the bypass to control amount of bypassing air, the method comprising the steps of

detecting a maximum opening of the throttle valve during a period from opening to closing of the throttle valve,

producing a first throttle position signal depending on the maximum opening of the throttle valve and producing a second throttle position signal when the throttle valve is closed to an idle position, respectively,

determining an opening degree of the control valve dependent on the first throttle position signal,

opening the control valve to said opening degree of the control valve, and

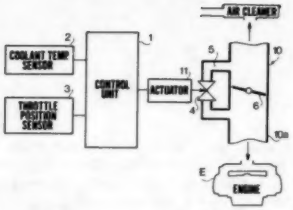
gradually closing the control valve from said opening degree of the control valve in response to the second throttle position.

4,672,936

INTAKE AIR CONTROL SYSTEM FOR AN AUTOMOTIVE ENGINE

Kunihiro Abe, Higashimurayama, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 21, 1985, Ser. No. 789,878
Claims priority, application Japan, Oct. 26, 1984, 59-226255
Int. Cl.[4] F62D 9/02
U.S. Cl. 123—239 7 Claims



1. A system for controlling the intake air in an automotive engine having an intake passage, a throttle valve in the intake passage, and a bypass provided for bypassing the throttle valve, comprising:

a control valve provided in the bypass to control the amount of bypassing air;

actuating means for operating the control valve;

means for detecting the temperature of a coolant of the engine and for producing a first temperature signal when the temperature is lower than a predetermined value and for producing a second temperature signal when the temperature of the coolant is higher than said predetermined value, respectively;

means for detecting the position of the throttle valve and for producing a throttle position signal when the throttle valve is closed to an idle opening position;

control means responsive to the first temperature signal and to the throttle position signal for actuating the actuating means so as to hold the control valve in an open state for a predetermined period dependent on the temperature, and thereafter to close the control valve, and

said control means responsive to said second temperature signal and to said throttle position signal for gradually closing the control valve.

4. A method for controlling intake air in an automotive engine having an intake passage, a throttle valve in the intake passage, a bypass bypassing the throttle valve, and a control valve provided in the bypass to control the amount of bypassing air, comprising the steps of

detecting the temperature of coolant of the engine and producing a first temperature signal when the temperature of the coolant is lower than a predetermined value and a second temperature signal when the temperature of the coolant is higher than the predetermined value,

detecting the position of the throttle valve and producing a throttle position signal when the throttle valve is closed to an idle opening position,

holding the control valve in an open state for a predetermined period dependent on the temperature upon occurrence of the first temperature signal and the throttle position signal, and closing the control valve after said period, and

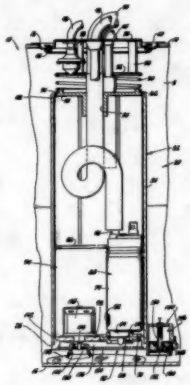
gradually closing the control valve in response to said second temperature signal and to said throttle position signal.

4,672,937

FUEL PUMP SYSTEM

Douglas I. Fales, and Robert A. Roth, both of Flint, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 19, 1986, Ser. No. 864,600
Int. Cl.[4] F02M *39/02*
U.S. Cl. 123—509 3 Claims



1. In a fuel pump system for an engine of an automotive vehicle having a fuel tank thereon defining a fuel chamber therein,

said fuel pump system including

a reservoir chamber within said fuel chamber, and

a fuel pump in said reservoir chamber having an electric motor portion simultaneously driving at a normal operating speed of said motor portion a first pump having an intake port and a discharge port and a second pump having an intake port and a discharge port,

said first pump at said normal operating speed of said motor portion providing a first fuel flow rate and said second pump at said normal operating speed of said motor portion providing a second fuel flow rate exceeding said first fuel flow rate,

the combination comprising,

means connecting said first pump discharge port to said engine,

means on said fuel pump defining a secondary chamber,

means connecting said first pump intake port to said secondary chamber and said second pump discharge port to said secondary chamber,

means on said pump defining a flow orifice between said secondary chamber and said reservoir chamber operative to flow fuel in opposite directions between said secondary and said reservoir chambers,

means in said fuel chamber defining a primary chamber having an intake port between said primary chamber and said fuel chamber,

means connecting said primary chamber and said second pump intake port so that said second pump normally draws fuel from said fuel chamber through said primary chamber and discharges fuel to said secondary chamber, the excess of said second fuel flow rate of said second pump over said first fuel flow rate of said first pump being discharged through said flow orifice from said secondary chamber to said reservoir chamber, and

means connected to said primary chamber responsive to the level of the surface of the pool of fuel in said fuel chamber operative to close said primary chamber intake port when the level of the pool surface is below a predetermined minimum level,

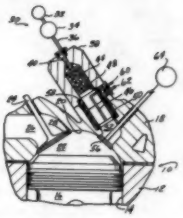
said first pump thereupon creating a vacuum in said secondary chamber so that fuel back-flows through said flow orifice from said reservoir chamber to said secondary chamber to maintain a supply of fuel at said first pump intake port.

4,672,938

METHOD AND APPARATUS FOR MULTIPHASIC PRETREATMENT OF FUEL TO ACHIEVE HYPERGOLIC COMBUSTION

Lyle O. Hoppie, Birmingham; Richard Chute, Troy; David H. Scharnweber, and Kenneth P. Waichunas, both of Milford, all of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Dec. 26, 1985, Ser. No. 813,881
Int. Cl.[4] F02M *31/18, 33/00*
U.S. Cl. 123—538 8 Claims



1. An arrangement for multiphasic pretreatment of fuel prior to combustion in a combustion device comprising:

a source of fuel under pressure;

first means for heating and vaporizing fuel received from said source of fuel;

catalytic activation means comprising a catalytic material disposed to partially activate said heated and vaporized fuel to a degree insufficient when combined with the activation effect of said first means to enable hypergolic combustion;

means for generating an electrical discharge and passing said heated, vaporized, and catalytically treated through said electrical discharge, said discharge of sufficient intensity to activate the entire mass of fuel to a degree sufficient to enable hypergolic combustion.

4,672,939

INTAKE MANIFOLD FOR INTERNAL COMBUSTION ENGINE HAVING EXHAUST GAS RECIRCULATION SYSTEM

Tatsuhisa Yokoi, Toyota; Eisaku Takeya, Nishikamo; Kyo Hattori, Toyota; Kazuo Abe, Susono, and Hideyuki Ozawa, Oobu, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota and Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, both of, Japan

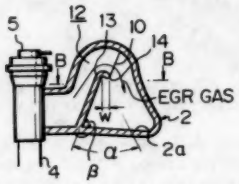
Filed Aug. 19, 1985, Ser. No. 766,784
Claims priority, application Japan, Sep. 29, 1984, 59-147736[U]
Int. Cl.[4] F02M *25/06*
U.S. Cl. 123—568 3 Claims

1. An intake manifold of an internal combustion engine having an exhaust gas recirculation system which introduces a part of exhaust gas from an exhaust passage through an EGR gas supply passage into said intake manifold, said intake manifold being provided with an EGR gas outlet opened thereto and connected to said EGR gas supply passage, said EGR gas outlet being located in an upper section of an interior of said intake manifold,

a part of said EGR gas supply passage, in the vicinity of said

EGR gas outlet, extending transversely along a side-to-top wall of said intake manifold,

said part of EGR gas passage defining at an opposite side thereof an inclined inner wall along said side-to-top wall



of said intake manifold, in a transverse cross-section of said intake manifold, said inclined inner wall having its top portion directed downward to define said EGR gas outlet, so that said EGR gas outlet is defined below an inner surface of the top wall of said inner intake manifold.

4,672,940

AIR-FUEL MIXTURE FLOW CONTROL STRUCTURE AND METHOD OF MAKING THE SAME

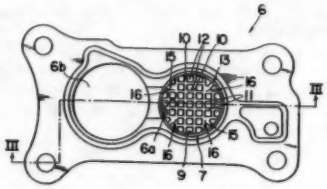
Hajime Nakayama; Osamu Aoki; Shigetoshi Nishijima; Haruo Horiuchi, all of Saitama; Takuya Sugino, Tokyo, and Shuichi Takagi, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 28, 1986, Ser. No. 845,632

Claims priority, application Japan, Apr. 1, 1985, 60-66678; Apr. 2, 1985, 60-48194[U]; Apr. 2, 1985, 60-48195[U]

Int. Cl.⁴ F02M *29/00*

U.S. Cl. 123—590 **17 Claims**



1. A flow control honeycomb structure for use in an intake passage of an engine for producing turbulent flow in an air-fuel mixture flowing through the intake passage, comprising:

a short cylindrical peripheral wall defining therein a circular passage having a substantially circular cross section;

a plurality of substantially perpendicular criss-cross partitions joined to and disposed in said peripheral wall and dividing said circular passage into a first group of square passageways at said cylindrical peripheral wall with each having a substantially square cross section and a second group of four triangular passageways at said cylindrical peripheral wall with each having a substantially triangular cross section and a relatively large cross-sectional area; and

a plurality of ribs extending obliquely from joints of those of said partitions which define said triangular passageways radially outwardly toward said peripheral wall through said triangular passageways, thereby dividing each of the triangular passageways into a plurality of subpassageways.

4,672,941

IGNITION SYSTEM

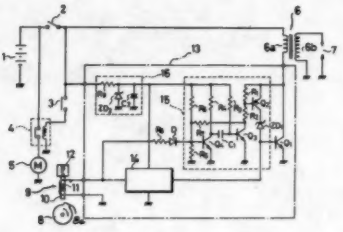
Tetsuo Yamagata, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 28, 1984, Ser. No. 655,947

Claims priority, application Japan, Sep. 28, 1983, 58-180018; Sep. 28, 1983, 58-180019

Int. Cl.⁴ F02P *3/06;* **F22B** *5/02*

U.S. Cl. 123—602 **6 Claims**



1. An ignition system for an internal combustion engine comprising

electronic pick-up means for providing first and second pulses whose polarities are different from each other,

ignition control circuit means for generating ignition pulses in response to said first and second pulses,

ignition coil means for causing a spark discharge on a spark plug, said ignition coil means having a primary winding,

power semiconductor means connected with said primary winding and being responsive to the ignition pulses from said ignition control circuit means for normally periodically providing signals to said primary winding for causing periodic spark discharges, and

inhibit circuit means responsive to each first pulse from said electronic pick-up means for generating a constant time duration pulse in response to each said first pulse, and said inhibit circuit means including (a) switch circuit means connected with said power semiconductor means for allowing said power semiconductor means to apply said signals to said primary winding when said second pulse is within the period of a constant time duration pulse and (b) suppressing the signals applied to the primary winding of the ignition coil means by said power semiconductor means does not occur within the period of said constant time duration pulse so as to inhibit spark discharge when the speed of the engine is below a predetermined value which is lower than the normal idle speed of the engine.

4,672,942

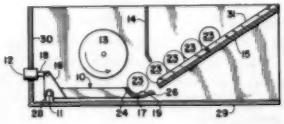
TARGET THROWING APPARATUS

Ronald R. Steward, P.O. Box 163, Altona, Ill. 61414

Filed Nov. 29, 1985, Ser. No. 802,736

Int. Cl.⁴ F41B *15/00, 11/00*

U.S. Cl. 124—1 **8 Claims**



1. A can throwing apparatus comprising:

(a) a launching arm mounted upon pivot means permitting reciprocative rotative motion of said arm in a vertical path, said arm having a control extremity and positioning extremity,

(b) manipulating means associated with said control extremity for moving said positioning extremity to alternating raised and lowered positions within said vertical path,

(c) a launching wheel adapted to rotate continuously at a constant high rate of speed in a vertical plane, said wheel being positioned above said launching arm and having a circular cylindric perimeter comprised of resilient material,

(d) an electric motor adapted to drive said launching wheel,

(e) upwardly directed gripping means spaced apart from the perimeter of said wheel and in facing relationship therewith,

(f) feed means adapted to confine a multitude of metal cans having circular cylindrical sidewalls in axially parallel abutting relationship and further adapted to deposit said cans by rolling movement about said sidewalls sequentially upon the positioning extremity of said launching arm, and

(g) means for limiting the movement of cans from the feed means to said positioning extremity, whereby

(h) when the positioning extremity is in its lowered position it receives one can from said feed means, and when in its raised position places the sidewall of said can into spanning contact with both the perimeter of said wheel and said gripping means, whereby

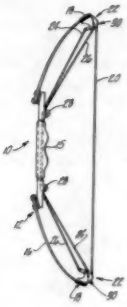
(i) the can is propelled upwardly from said apparatus with an axial spin which stabilizes the path taken by the can.

4,672,943

ARCHERY BOW WITH DRAW FORCE MULTIPLYING ATTACHMENTS

John W. Bozek, 6093 Waterfront Dr., Waterford, Mich. 48095

Continuation of Ser. No. 619,552, Jun. 11, 1984, abandoned.
This application Mar. 31, 1986, Ser. No. 846,484
Int. Cl.[4] F41B *5/00*
U.S. Cl. 124—23 R **6 Claims**



1. An archery bow comprising:

a bow member comprised of an elongated central handle section and a pair of elongated resilient limbs joined to said handle section at either end, each of said limbs curving towards one side of said handle section and terminating in a limb tip, each of said tips substantially aligned on said one side of said handle section with each other;

a triple-element rotary device comprised of first, second and third rotary elements each mounted on each of said tips, and a driving connecting causing each of said rotary elements to rotate together about a common axis;

a bowstring extending between said tips, and means drivingly connecting said bowstring at either end to a respective first rotary element to apply a torque to each of said first rotary elements upon drawing of said bowstring to cause rotation of said first rotary elements of said rotary device;

the configuration of said first rotary element and said connection of said bowstring thereto producing a variable leverage by said bowstring draw tending to produce rotation thereof which increases with increasing draw to thereby reduce draw resistance;

a first load cable connected at either end to a respective one of said second and third rotary elements to apply a force tending to rotate said second and third elements mounted on opposite tips of said bow limbs;

a second load cable connected at either end to a respective one of said second and third rotary elements tending to rotate said second and third rotary elements mounted on opposite tips of said bow limbs which are not connected to said first load cable tending to apply a force;

said points of connection of said first ad second load cables to said second and third rotary elements mounted on each of said tips of said bow member producing opposing but unequal effective leverage of said first and second load cables in acting on said rotary device;

said point of connection of said bowstring to said first rotary elements being located to tend to produce rotation of said second and third rotary elements so as to draw the load cable connected to the greater leverage of said second and third rotary elements away from said handle section of said bow member;

said points of connection of said first and second cables to said second and third rotary elements eccentric to said common axis and on either side of said common axis with said bowstring undrawn, located such that said first and second cables are moved towards each other as said rotary devices re rotated by said bowstring;

guide means directing both of said first and second load cables to extend in directions substantially aligned with each of said limbs and said handle section of said bow member;

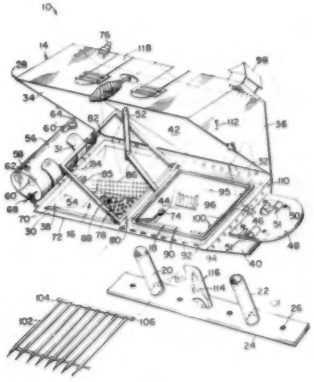
whereby drawing of said bowstring causes rotation of said rotary device to produce forces acting on said limbs by both said first and second load cables in a generally longitudinal direction to said limbs, and transversely by said bowstring and whereby the deflection of each of said limbs is coordinated by said first and second load cables connected to said second and third rotary elements.

4,672,944

MINI-KITCHEN

Raymond L. Curry, 5306 Nelson Ave., Baltimore, Md. 21215

Filed May 28, 1986, Ser. No. 867,504
Int. Cl.[4] A47J *37/07*
U.S. Cl. 126—25 R **12 Claims**



1. A system for food preparation by heating, comprising a structure of first and second similar elements meeting at a

horizontal plane and joined along a first edge so that the first element serves a downwardly concave lid that can pivot upwardly from the second element, means adapting the second element to serve as an upwardly concave base including means for affixing the second element to a pick-up truck bed coaming, means dividing said structure transversely intermediate the length thereof into a first compartment and a second compartment, means adapting the first compartment for use as a grill, and means adapting the second compartment for use as a steam oven.

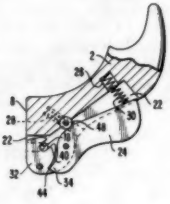
12. A system for preparation of food by heating with burning charcoal beneath a grill, the grill having a central area and a marginal area comprising first and second areas lateral of the central area, the burning charcoal arranged directly beneath the central area for heating the central area, means for heating said first and second marginal areas for evening said heating thereof relative to central area, comprising: a plurality of flat plate means for reflecting disposed diagonally relative to said grill and arranged for receiving heat laterally from the burning charcoal, reflecting said received heat upwardly through said first and second marginal areas and laterally over the grill and downward through said first and second areas of the grill, and thereby evening said heating.

4,672,945

ARCHERY TRIGGER RELEASE MECHANISM

William G. Carlton, P.O. Box 592, Folly Beach, S.C. 29439

Filed Aug. 20, 1984, Ser. No. 642,097
Int. Cl.[4] F41C *19/00*; **F41B** *5/00*
U.S. Cl. 124—35 A **2 Claims**



1. A trigger release mechanism for use with an archery bow, comprising:

a. an elongated body member having an open longitudinal void therein further opening to a frontal surface of said body member, wherein said frontal surface of said body member is flat, and has a void therein into which a bowstring is placed, said void being perpendicular to and intersecting said longitudinal void, and having a cylindrical void on either side of said longitudinal void and engaging said perpendicular void, into which an arrow may be placed so as to engage said bowstring;

b. a pivot member rotatably mounted within said void near the frontal surface thereof, and having a slot therein into which said bow string is placed; and

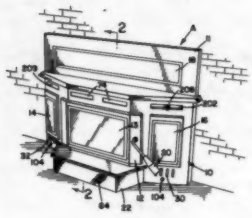
c. a trigger member rotatably mounted within said void and engaging said pivot member on a surface thereof so as to tend to be rotated by said pivot member as said pivot member rotates in a direction opposite thereto, wherein the engagement of the trigger member stops the rotation of said pivot member by an increasing radius of said trigger member and/or said pivot member along said surface so as to prevent the release of said bow string, and whereby said pivot member is allowed to rotate and release said bow string upon disengagement of said trigger member from said pivot member.

4,672,946

SECONDARY COMBUSTION DEVICE FOR WOODBURNING STOVE

Richard D. Craver, Orrville, Ohio, assignor to Orrville Products, Inc., Orrville, Ohio

Filed May 5, 1986, Ser. No. 859,336
Int. Cl.[4] F24C *1/14*
U.S. Cl. 126—77 **54 Claims**



1. In a wood burning stove including an exhaust flue opening, a combustion chamber for primary combustion having an access door, a support for wood to be burnt and a primary air inlet means for supplying air to support primary combustion of said wood to produce flue gases containing combustible particulate material, conduit means for directing said flue gases from said combustion chamber to said flue opening in a preselected path and secondary combustion means for burning said particulate material in said flue gases before said flue gases pass through said exhaust flue opening, the improvement comprising: said secondary combustion means including an elongated manifold extending laterally across and above said combustion chamber at a preselected position on said preselected path, a number of air openings spaced longitudinally along said manifold and facing said path of said flue gases and an air inlet means for supplying ambient, secondary combustion air to said manifold for flow from said openings into said path of said flue gases in a plurality of distinct jets, and a laterally elongated passageway above said manifold with upper and lower portions and defined at its upper portion by a sheet metal wall, and a layer of extremely low heat conducting insulation in said passageway and on said sheet metal wall whereby said layer of insulation prevents appreciable conduction of heat from said passageway into said sheet metal wall and said flue gases flow through said passageway and from said passageway in a generally wide thin flow pattern.

4,672,947

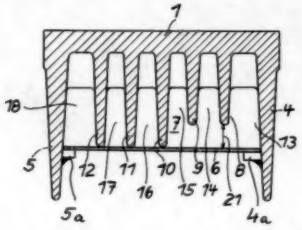
GRATE BAR FOR USE IN INDUSTRIAL FURNACES

Johannes J. E. Martin, St. Heinricher Str. 55, D-8124 Seeshaupt, Fed. Rep. of Germany

Continuation of Ser. No. 524,031, Aug. 17, 1983, abandoned. This application Aug. 8, 1985, Ser. No. 763,880
Claims priority, application Fed. Rep. of Germany, Aug. 17, 1982, 3230597
Int. Cl.[4] F23H *11/00*
U.S. Cl. 126—163 R **23 Claims**

1. A grate bar, particularly for use in the grates of industrial furnaces, comprising an elongated top wall; a front wall extending substantially transversely of and downwardly from the region of one end of said top wall; a rear wall extending substantially transversely of and downwardly from the region of the other end of said top wall; a pair of elongated sidewalls extending longitudinally of and downwardly from said top wall, at least between said front and rear walls; a bottom wall spaced apart from said top wall and defining therewith, as well as with said sidewalls and said front and rear walls, an air heating chamber, said grate bar having at least one first opening in the region of said rear wall for admission of fresh air into, and one of said sidewalls having a second opening in the region of said front wall for evacuation of air from, said chamber; and

a plurality of cooling ribs extending from said top wall downwardly into said chamber to exchange heat with air flowing from said first toward said second opening, said ribs dividing said chamber into a plurality of channels extending substantially longitudinally of said top wall, and a compartment adja-



cent to said front wall and communicating with said channels as well as with said second opening, said ribs including a first rib which is nearest to said one sidewall and is spaced apart from said bottom wall by a distance sufficient to provide room for migration of solid particles.

4,672,948

SOLAR RADIATION COLLECTOR

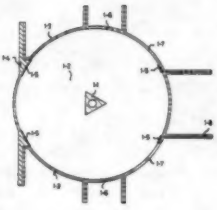
Francisco J. B. Rosende, Ibiza, 37 - 7°Izqda., Madrid 9, Spain

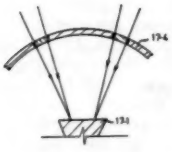
Division of Ser. No. 604,603, Apr. 27, 1984, Pat. No. 4,553,531. This application Oct. 4, 1985, Ser. No. 784,713

Claims priority, application Spain, May 10, 1983, 522.260; Jan. 31, 1984, 529.345; Mar. 20, 1984, 530.792

Int. Cl.⁴ F24J 3/02

U.S. Cl. 126—438 **8 Claims**





1. A solar radiation collector comprising a horizontally elongated receiver through which a medium to be heated by solar radiation passes in a direction parallel to the length of said receiver, a concentrator for concentrating solar radiation onto said receiver, and an intermediate device positioned between said concentrator and said receiver for reducing energy losses due to radiation emitted by said receiver, said intermediate device surrounding and completely enclosing said receiver and having a uniform cross sectional configuration along portions of length parallel to the length of said receiver and having at least one elongated closed transparent window parallel to the length of said receiver for transmitting solar radiation focussed by said concentrator onto said receiver, said intermediate device having reflective arcuate surfaces for reflecting said solar radiation reflected from said receiver back onto said receiver and onto other arcuate surfaces of said intermediate device thereby to reduce the amount of radiation existing through said window, said concentrator comprising at least one concave mirror disposed below said receiver and outside said intermediate device, said mirror being horizontally elongated in the direction of and parallel to said receiver and having a cross-sectional configuration that is uniform along its length, and means mounting said receiver and concentrator and intermediate device for rotation about a single axis of rotation for tracking the sun, said axis of rotation comprising a longitudinal axis of said receiver.

4,672,949

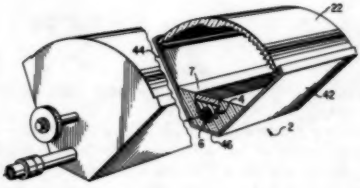
SOLAR ENERGY COLLECTOR HAVING AN IMPROVED THERMAL RECEIVER

Mark J. O'Neill, Richardson, Tex., assignor to Entech, Inc., DFW Airport, Tex.

Filed Feb. 13, 1985, Ser. No. 701,308

Int. Cl.⁴ F24J 2/08

U.S. Cl. 126—440 **19 Claims**



1. A solar energy collector, comprising:

housing means;

lens means supported by said housing means, said lens means being operable to concentrate incident solar radiation along a focal axis of the solar energy collector; and

receiver means arranged within and supported by said housing means along the focal axis for receiving the concentrated solar radiation, said receiver means having a layer of transparent material comprising a series of juxtaposed prisms arranged perpendicularly with respect to the focal axis for exposure to the concentrated solar radiation.

4,672,950

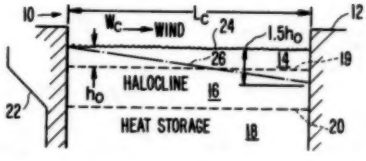
METHOD OF AND APPARATUS FOR PROTECTING A HALOCLINE IN A SALT-WATER SOLAR POND AGAINST THE EFFECTS OF WIND

Gad Assaf, Rehovot, and Mordechai Regev, Nes Ziona, both of Israel, assignors to Solmat Systems Ltd., Yavne, Israel

Filed Apr. 13, 1982, Ser. No. 367,885

Int. Cl.⁴ F25J 3/02

U.S. Cl. 126—452 **25 Claims**



1. A method for controlling the tilting of the pycnocline, i.e., the interface between the halocline of a salt-water solar pond and the wind-mixed layer thereabove, comprising dividing

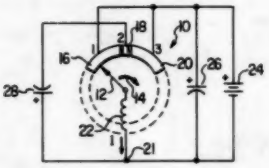
only the upper portion of the pond into a plurality of cells using paritions of a depth that extend into the halocline whereby the partitions are effective to limit the degree to which the pycnocline tilts within the cells such that the pycnocline is prevented from breaking to the surface.

4,672,951

METHOD AND APPARATUS FOR TREATMENT OF BIOLOGICAL TISSUE

Albert B. Welch, Dallas, Tex., assignor to Bio-Electric, Inc., Knoxville, Tenn.

Filed Dec. 30, 1985, Ser. No. 814,255
Int. Cl.[4] A61N *1/40*
U.S. Cl. 128—1.5 **16 Claims**



1. Apparatus for noninvasive treatment of biological tissue comprising:

means for generating a bipolar driving current;

means responsive to the bipolar driving current to induce pulse electric fields that repeat at spaced time intervals into a localized treatment area, said means to induce including means for generating an electric field waveform that has a first pulse in a first direction having a selected value followed by a second pulse in a second direction having a second value larger than the value of the first pulse, and followed by a third pulse in the first direction having a value on the order of the value of the first pulse, where the waveform is followed by an inactive interval and repeats for a selected number of repetitions; and

means connected to said means to induce a pulse electric field to couple the energy of the first pulse to generate the second pulse and couple the energy from the second pulse to generate the third pulse and store the energy from the third pulse.

4,672,952

ADJUSTABLE PACK SUPPORT BRACKET

John H. Vrzalik, Rte. 6, Box 327-B, San Antonio, Tex. 78220

Division of Ser. No. 482,319, Apr. 5, 1983, Pat. No. 4,578,833.
This application Jun. 10, 1985, Ser. No. 743,048
Int. Cl.[4] A61H *1/00*
U.S. Cl. 128—33 **12 Claims**

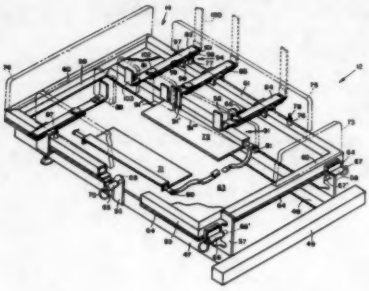
12. An adjustable pack means for securing a patient on an oscillating bed comprising:

a first strap means and means for releasably mounting said first strap means to an oscillating bed;

a second strap means having a bracket pivotally mounted to one end thereof;

a cushion mounted to the pivoting bracket for releasably engaging a portion of the body of a patient lying on the oscillating bed;

a hinge connecting said first strap means to the end of said second strap means to which the bracket is not attached whereby the cushion mounted to the bracket can be pivoted away from the body of the patient lying on the oscillating bed for access for the patient; and



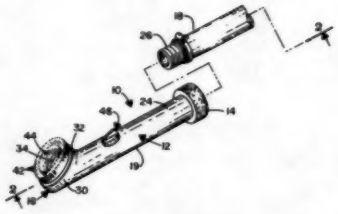
means for releasably retaining said second strap means in engagement with said first strap means.

4,672,953

ORAL HYGIENE APPARATUS

Enrico E. DiVito, 15001 N. 46th Pl., Phoenix, Ariz. 85032

Filed Jun. 6, 1985, Ser. No. 741,860
Int. Cl.[4] A46B *11/06*
U.S. Cl. 128—66 **10 Claims**



1. An oral hygiene apparatus for facilitating the accomplishment of an oral hygiene program, said apparatus being connectable to a hose means for supplying liquid under pressure from a remote source to said apparatus and for coupling a negative static pressure from a remote source thereto, said apparatus comprising:

(a) a handle defining separated first and second passages which extend axially therethrough;

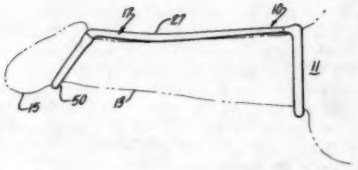
(b) coupling means on one end of said handle for connection to the hose means for supplying the liquid under pressure to the first passage of said handle and for coupling the negative static pressure to the second passage thereof; and

(c) brush head means on the opposite end of said handle and including a body defining a substantially planar surface with a suction opening which opens centrally onto the planar surface and is in communication with the second passage of said handle, said brush head means having bristle means which includes a plurality of bristle tufts which extend from the planar surface of said body and are arranged in a first concentric array about the suction opening of said body and a second outwardly spaced concentric array, said body having at least one liquid discharge port which opens onto the planar surface defined by said body between the first and second concentric arrays of said bristle means and is in liquid receiving communication with the first passage of said handle.

4,672,954
SEXUAL AID

Jack S. Panzer, 12930 Denmark, Detroit, Mich. 48217

Filed Oct. 3, 1985, Ser. No. 783,473
Int. Cl.[4] A61F 5/41
U.S. Cl. 128—79 10 Claims



1. A sexual aid for use by a human male comprising:

a parallel pair of somewhat rigid but slightly flexible rods adjacently encased in a slightly elastic casement, so that said rods are rotatable against one another, each of said rods having one end disposable adjacent the root of the penis, and another end disposable adjacent the corona of the penis, and forming a column disposable alongside the dorsal surface of the penis;

an arcuate base member affixed to said root end of each of said rods, disposed about perpendicularly thereto, such that said base members together form a base ring abuttable against the torso, disposable closely about and substantially encircling the root of the penis, so that said base members are pivotable relative to one another;

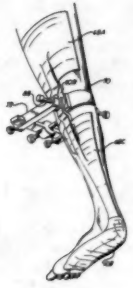
an arcuate collar member affixed to said cornonal end of each of said rods, each collar member possessing a free end, such that said free ends are urged away from one another upon pivoting of said base members away from each other; and

elastic means extending between such free ends of said collar members for forming, in combination with said collar members, a collar about the corona of the penis.

4,672,955
ORTHOSIS, METHOD OF MAKING AND KIT THEREFOR

Adriaan Cooper, Huntington, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jun. 2, 1986, Ser. No. 869,522
Int. Cl.[4] A61F 3/00
U.S. Cl. 128—80 F 7 Claims



1. A knee orthosis fittable about a calf and thigh comprising:

four subassemblies of a composite material each subassembly containing at least one layer curable by exposure to ultraviolet radiation;

a first of the four subasssemblies formably fittable about the medial and posterior sides of the thigh, and having an integrally formed sidebar suitable to extend along the medial side of the knee;

a second of the four subassemblies formably fittable about the lateral and posterior sides of the thigh, having an integrally formed sidebar suitable to extend along the lateral side of the knee, and overlapping at its posterior edge the posterior edge of the first of the four subassemblies;

a third of the four subassemblies formably fittable about the medial and posterior sides of the calf, and having an integrally formed sidebar suitable to extend along the medial side of the knee;

a fourth of the four subassemblies formably fittable about the lateral and posterior sides of the calf, having an integrally formed sidebar suitable to extend along the lateral side of the knee, and overlapping at its posterior edge the posterior edge of said third of the four subassemblies;

wherein the first and second of the four subassemblies are bonded to one another at the site of their overlapping posterior edges; and

wherein the third and fourth of the four subassemblies are bonded to one another at the site of their overlapping posterior edges.

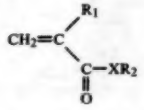
4,672,956
BANDAGES, COMPONENTS THEREOF AND USE

William D. Potter, Stortford; Sinan B. Kiamil, Harlow, and Nicholas D. White, Stortford, all of United Kingdom, assignors to Smith and Nephew Associated Companies p.l.c, United Kingdom

PCT No. PCT/GB83/00133, § 371 Date Oct. 19, 1983, § 102(e) Date Oct. 19, 1983, PCT Pub. No. WO83/03973, PCT Pub. Date Nov. 24, 1983
PCT Filed May 6, 1983, Ser. No. 562,593
Claims priority, application United Kingdom, May 6, 1982, 8213169; Jul. 23, 1982, 8221385; Aug. 24, 1982, 8223254; Dec. 22, 1982, 8236413
Int. Cl.[4] A61F 5/04
U.S. Cl. 128—90 19 Claims

1. An orthopaedic bandage which comprises a support carrying a vinyl compound, which compound polymerises when exposed to a water-activated vinyl polymerisation catalyst, in which the vinyl compound is a hydrophilic prepolymer which contains not less than two polymerisable vinyl groups said prepolymer comprising

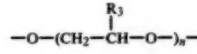
(a) a vinylic component of the formula:



(I)

wherein R_1 is hydrogen or methyl; X is O or NH and R_2 is selected from the group consisting of hydroxyalkyl, hydroxyaryl, aminoalkyl, aminoaryl and aminoaryl substituted at the nitrogen by alkyl;

(b) a hydrophilic components selected from the group consisting of a polyoxyalklated vinyl compound and a compound containing a moiety of the formula:



(II)

wherein n is 10 to 255; R_3 is hydrogen or methyl; R^4 is a bond, hydrogen or lower alkyl and R_3 is the same or different in adjacent repeat units with the proviso that at least 50% of the units, R_3 is hydrogen and

(c) a polyfunctional organic compound capable of forming

ester, ether, amide or urethane linkages with the components of (a) and (b).

19. A process for the preparation of an orthopaedic bandage according to claim 1 which process comprises coating or impregnating a support with a hydrophilic prepolymer of claim 1 which polymerises when exposed to a water-activated polymerisation catalyst, the catalyst or at least one component thereof being uniformly dispersed in the hydrophilic prepolymer.

4,672,957

SURGICAL DEVICE

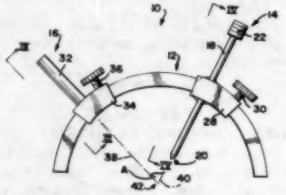
Donald H. Hourahane, Roodepoort, South Africa, assignor to South African Inventions Development Corporation, Pretoria, South Africa

Filed Sep. 26, 1984, Ser. No. 654,495

Claims priority, application South Africa, Oct. 4, 1983, 83/7419

Int. Cl.[4] A61F *5/04*

U.S. Cl. 128—92 VD **7 Claims**



1. A surgical device for use in conjunction with an arthroscope comprising:

a probe for insertion into a joint through soft tissue underlying the skin during a surgical operation, the probe being a rod having a pointed end for insertion through the soft tissue to a point in the joint viewable by the arthroscope,

a drill guide for guiding a bone drill during the operation, the drill guide having a straight passage therethrough for receiving and guiding a bone drill bit,

a bracket having a curved limb,

means for mounting the probe and the guide on the bracket,

said mounting means including a support for at least one of said probe and said guide, the support being slidable along the curved limb when unlocked from the limb, and

the support including means for releasably locking the support to the limb in a plurality of different positions along the length of the limb in which positions the guide has different inclinations relative to the probe.

4,672,958

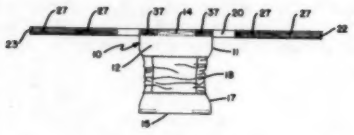
QUICK RELEASE INFANT BODY RESTRAINT

Catherine E. Garman, Skyline Dr., Box 141A, Reading, Pa. 19606

Filed Dec. 28, 1984, Ser. No. 687,298

Int. Cl.[4] A61F *5/46*

U.S. Cl. 128—134 **2 Claims**



1. An improved, quick release, lower torso restraining device useful in monitoring the symptoms of infant crib death syndrome in combination comprising

(a) an hour glass shaped lower torso holding member made of cloth having an inner, body-side surface; an outer, obverse surface; a top portion; a bottom portion and side edge portions; and having

(b) sewn along the upper portion's edge on the obverse surface by stitch means beginning centrally therefrom, an elongated, rectangularly shaped transverse cloth belt member having restraining tether portions at each end thereof, the stitch means ending a defined distance from the upper portion's intersection with the side edges which form free corners in the upper portion to form unattached regions in the belt contiguous thereto and onto whose

(c) holding member's free corners are sewn rectangular top pads of Velcro ® on the body surface thereof which are compressingly enmeshed to and mate stickingly with rectangular bottom pads of Velcro ® sewn on the obverse surface of the holding member in corners formed by the bottom portion's intersection with the side edges when the bottom potion is folded upward through the baby's crotch to enwrap the lower torso thereby restraining the infant and quickly releasing the infant from the holding member by manually unmeshing the pads.

4,672,959

MOUTHPIECE

Robert H. May, Plymouth, and Robert A. Burgoyne, Eden Prairie, both of Minn., assignors to Proflek, Inc., Wayzata, Minn.

Filed Sep. 27, 1985, Ser. No. 781,406

Int. Cl.[4] A61F *5/56*

U.S. Cl. 128—136 **17 Claims**

1. Protective mouthpiece positioned on the user's teeth, with the user having anterior and posterior teeth, with the teeth having outer, inner, and biting surfaces, comprising, in combination: an elongated shell of flexible, shock absorbing polymeric material having an essentially U-shaped cross section defined by inner and outer upstanding portions and a connecting portion, the shell being arcuately formed over its length to fit over a row of teeth including the anterior and prosterior teeth, said outer and inner upstanding portions and said connecting portion adapted to respectively overlie and directly engage the outer, inner and biting surfaces of the user's teeth; and a protruding rib-like brace located on the outer upstanding portion of the elongated shell opposite the outer surface of the anterior teeth and intermediate the upper and lower extremities of said upstanding portion for reflecting any blow to the anterior teeth and reducing the shock to the teeth.

4,672,960

AUTOMATIC INTUBATION DEVICE FOR GUIDING ENDOTRACHEAL TUBE INTO TRACHEA

Alfred R. Frankel, Pass-A-Grille Beach, Fla., assignor to Renbec International Corporation, Tampa, Fla.

Continuation-in-part of Ser. No. 640,843, Aug. 15, 1984, abandoned. This application Jan. 21, 1986, Ser. No. 820,664

Int. Cl.[4] A61M *16/00*

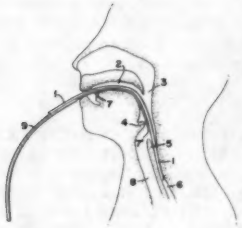
U.S. Cl. 128—200.26 **22 Claims**

1. A device for facilitating the insertion of an endotracheal tube into a patient's trachea comprising:

(a) a flexible guide having no more than slight curvature along its length, having a size and length appropriate for insertion through the patient's mouth and pharynx and

into the patient's esophagus and having a male or female adaptor extending along a substantial portion of the length thereof;

(b) the endotracheal tube comprising a flexible tube having greater curvature along its length than that of said guide, having a size and length appropriate for insertion through the patient's mouth and pharynx into the patient's trachea



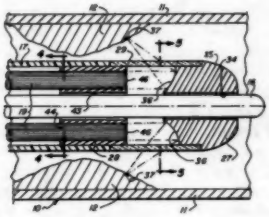
and having a female or male adaptor extending along at least a portion of the length thereof, said female or male adaptor being complementary in shape and size to fit onto or into the said adaptor on said guide so as to be slidably mounted thereon, the said guide and tube being connected for use by having at least a portion of the said male adaptor inserted inside the said female adaptor.

4,672,961

RETROLASING CATHETER AND METHOD

David H. Davies, 4964 Sundance Sq., Boulder, Colo. 80301

Filed May 19, 1986, Ser. No. 865,073
Int. Cl.[4] A61B 17/36
U.S. Cl. 128—303.1 **13 Claims**



1. In a catheter adapted to be inserted into a coronary artery and the like for removing plaque deposits which narrow the artery including at least an inner guide wire, a flexible tube having a distal end slidable over said guide wire, and optical fibers having distal ends extending through said tube to transmit laser energy from a source to said distal end of said tube, the combination comprising:

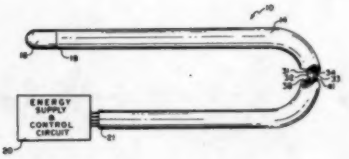
a tip assembly on the distal end of said tube having a central bore portion through which the guide wire extends for guided movement through the artery, said assembly having a window portion, an external surface and a backwardly facing laser energy reflective surface for reflecting laser energy delivered through the distal ends of said optical fibers in a forward direction along the longitudinal axis of said assembly in a reversed direction back through said window portion and focusing said laser energy at focal points of said reflective surface a selected distance beyond the external surface of said assembly.

4,672,962

PLAQUE SOFTENING METHOD

Harold Hershenson, Coral Gables, Fla., assignor to Cordis Corporation, Miami, Fla.

Continuation of Ser. No. 536,852, Sep. 28, 1983, abandoned. This application Oct. 7, 1985, Ser. No. 785,108
Int. Cl.[4] A61B 17/35
U.S. Cl. 128—303.1 **6 Claims**



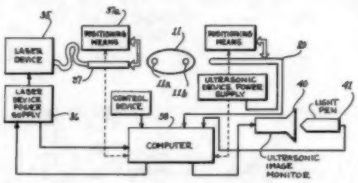
1. A method for resolving atherosclerotic plaque in a blood vessel including the steps of: inserting and manually manipulating a catheter including an elongate flexible tubular body having at the distal end thereof heating means comprising a non-laser, resistance type, electrical heating element, into and through the lumen of a blood vessel; positioning said heating means proximate to atherosclerotic plaque buildup in the blood vessel; heating said heating means to a predetermined temperature between 5° C. and 15° C. above the blood ambient temperature; and maintaining said heating means at said predetermined temperature proximate to the plaque buildup for a sufficient predetermined time period sufficient to resolve, such as by softening the plaque buildup but not sufficient to burn the plaque while leaving the surrounding tissue of the blood vessel unharmed.

4,672,963

APPARATUS AND METHOD FOR COMPUTER CONTROLLED LASER SURGERY

Israel Barken, 532 North Caribe, Tucson, Ariz. 85716

Filed Jun. 7, 1985, Ser. No. 742,278
Int. Cl.[4] A61B 17/36
U.S. Cl. 128—303.1 **10 Claims**



1. Apparatus for destroying unwanted internal tissue comprising:

ultrasonic probing means for applying ultrasonic signals to an internal body region of a patient;

laser irradiation means for irradiating pre-determined areas of said internal body region of said patient;

ultrasonic receiving means for receiving said applied ultrasonic signals, said applied ultrasonic signals conveying information about tissue in said internal body region and information about the position of said laser irradiation means in said internal body region of the patient; and

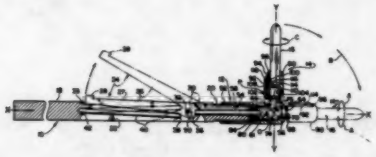
computer means for receiving said conveyed tissue and laser irradiation means information, said computer means controlling both intensity and duration of energy emitted by said laser irradiating means based upon said conveyed information.

4,672,964

SCALPEL WITH UNIVERSALLY ADJUSTABLE BLADE

Robert N. Dee, 31 Tuckahoe Ave., Eastchester, N.Y. 10709, and Charles Reich, 57 W. 57th St., New York, N.Y. 10019

Filed Feb. 21, 1986, Ser. No. 831,801
Int. Cl.[4] A61B *17/32*
U.S. Cl. 128—305 9 Claims



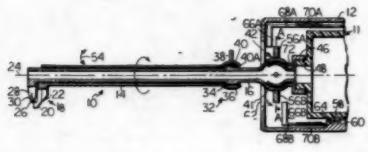
1. A scalpel comprising an elongated cylindrical handle closed at its proximal end and having a hollow sleeve portion formed with a spherical socket and cleft at its distal end adapted to receive a chuck in which a blade is fixedly secured, said chuck including a spherical base slidably seated in said socket for rotation of said chuck in an arc of at least 360 degrees therein and a shank extending through said cleft for swinging said chuck in an arc of at least 90 degrees, means for releasably locking said chuck in a selected position of rotation and swing comprising a stop plate slidable axially within the sleeve portion in opposition to the spherical base of said chuck and an over-the-center crank mechanism aligned with said stop plate in said handle for reciprocally displacing said stop plate within said sleeve to alternately effect proximal movement of said stop plate into an inoperative position free of said spherical base thereby permitting rotation of said chuck and distal movement of said stop plate into an operative position pressed against said spherical base to lock said chuck against rotation, said over-the-center crank mechanism including a lever extending radially outward from said handle when said stop plate is in its inoperative position and lying flat against said handle when said stop plate is in its operative position, said lever being manipulatable conjointly with the manipulation of said handle by a single hand of the user.

4,672,965

SURGICAL APPARATUS

Gilbert Baum, 152 Brire Ave., Scarsdale, N.Y. 10583

Filed Aug. 16, 1984, Ser. No. 641,376
Int. Cl.[4] A61B *17/22*
U.S. Cl. 128—305 23 Claims



1. A surgical apparatus for incising tissue, said apparatus comprising:

a first elongate member;

a first cutting means located at a first end of said first elongate member, said first cutting means being for cutting through the tissue in either one of a first direction parallel to said first elongate member or a second direction at an angle with respect to said first direction;

a second elongate member coaxially disposed with respect to said first elongate member;

a second cutting means located at an end of said second elonagate member, said second cutting means being for cutting in the other of said first and second directions;

said first elongate member and said second elongate member being configured so that one of said first elongate member and said second elongate member surrounds a substantial portion of another of said first elongate member and said second elongate member, and so that said first cutting means and said second cutting means are in close proximity to each other; and

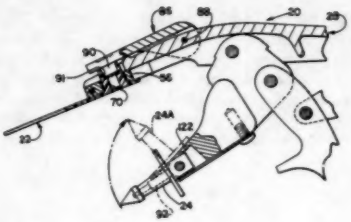
a positioning means for causing relative axial rotation of said first elongate member with respect to said second elongate member while permitting at most only limited axial displacement of said first elongate member with respect to said second elongate member so that said first cutting means and said second cutting means can be moved rotationally past one another.

4,672,966

DEVICE FOR ATTACHING AN IDENTIFICATION TAG TO AN EAR OR THE LIKE OF AN ANIMAL

Elmer J. Haas, Jr., P.O. Box 128, Dayton, Ky. 41074

Filed Mar. 20, 1985, Ser. No. 713,991
Int. Cl.[4] A01K *11/00*
U.S. Cl. 128—330 7 Claims



1. A tool for attaching an identification tag body and a tag retainer to an ear of an animal which comprises a main handle member, a first bracket pivotally mounted on the main handle member, there being an opening in the first bracket for receiving a hollow boss of the tag body, a second bracket pivotally mounted on the main handle member, a boss on the second bracket receivable inside the hollow boss of the tag body when in a tag body supporting position, a link assembly pivotally mounted on the main handle member, a drive pin member for receiving the tag retainer, means for resiliently mounting the drive pin member on the link assembly and for urging the drive pin member toward a position relative to the link assembly in which the tag retainer enters the hollow of the boss of the tag body as the link assembly is advanced in a retainer actuating direction, and means for driving the link assembly in retainer actuating direction to drive the tag retainer through the ear of the animal and into position for holding by the boss of the tag body, the second bracket being urgible to released position by the tag retainer, the first bracket swinging to free the tag and the tag retainer from the tool as the link assembly falls away from the main handle member.

4,672,967

TAG IMPLANTATION SYSTEM AND METHOD

David V. Smith, 14014 Salmon Creek Ave., Vancouver, Wash. 98686

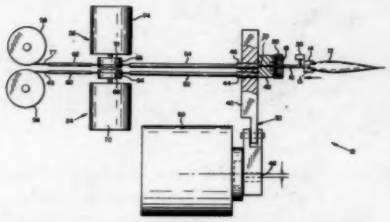
Filed Apr. 18, 1986, Ser. No. 853,543
Int. Cl.[4] A61B *17/00*
U.S. Cl. 128—330 19 Claims

1. A system for implanting a magnetizable tag into a macro-organism comprising:

an organism receiving element for receiving an abutted surface of the macro-organism to be tagged;

means for advancing the tag toward said receiving element, said advancing means being interconnected with said receiving element;

guide annulus means associated with said advancing means for providing an injection path of travel; and



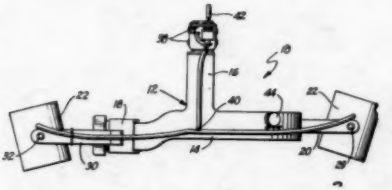
magnetization means for magnetizing the tag as the tag is passed through said guide annulus.

4,672,968

HEADWEAR WITH BUILT-IN COOLING MEANS

Jerril C. Lenox, and Jesse Solis, both of P.O. Box 3156, Riverside, Calif. 92519

Filed Aug. 30, 1985, Ser. No. 771,031
Int. Cl.[4] A42C 5/04; A61F 7/00
U.S. Cl. 128—380 **9 Claims**



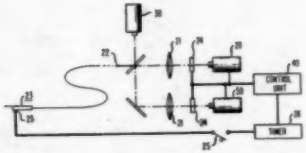
1. A headpiece with integrated cooling means comprising:
a first electrically-powered fan assembly, including:
a first fan blade;
a first electric motor having a drive shaft drivingly connected to said first fan blade;
first cylindrical housing means; and
first support means interconnecting the first electric motor and first cylindrical housing means to position said first fan blade in the first cylindrical housing means in coaxial relationship therewith;
said first fan blade being diametrically sized to fit within said first cylindrical housing means in close tolerance with its inner wall surface;
said first support means comprising at least two flat vanes integral with and interconnecting said first electric motor and said first cylindrical housing means in planar positions presenting no surfaces greater than their transverse cross-sectional areas to block or divert the path of airflow through said first cylindrical housing means, thereby insuring minimal obstruction to said airflow; and
said first fan assembly being positioned to blow air generally downwardly in front of the face of its wearer;
a second electrically-powered fan assembly, including:
a second fan blade;
a second electric motor having a shaft drivingly connected to said second fan blade;
second cylindrical housing means; and
second support means interconnecting the second electric motor and second cylindrical housing means to position said second fan blade in the second cylindrical housing means in coaxial relationship therewith;
said second fan blade being diametrically sized to fit within said second cylindrical housing means in close tolerance with its inner wall surface;
said second support means comprising at least two flat vanes integral with an interconnecting said second electric motor and said second cylindrical housing means in planar positions presenting no surfaces greater than their transverse cross-sectional areas to block or divert the path of airflow through said second cylindrical housing means, thereby insuring minimal obstruction to that airflow; and
said second fan assembly being positioned to blow air generally downwardly in back of the head of its wearer; and
a welder's helmet frame, bracket means affixed to the front and back of the helmet frame and means pivotally securing the first and second fan assemblies to the bracket means whereby each of the assemblies can be manually pivoted to any desired position and remains in that position until pivoted to another position.

4,672,969

LASER HEALING METHOD

Douglas Dew, Maitland, Fla., assignor to Sonomo Corporation, Maitland, Fla.

Filed Oct. 6, 1983, Ser. No. 539,527
Int. Cl.[4] A61N 5/06
U.S. Cl. 128—397 **8 Claims**



1. A method of reconstructing biological tissue wherein a proteinaceous framework is formed from denatured protein in the vicinity of the tissue being reconstructed, which framework approximates the biological tissue being reconstructed, the method comprising the step of non-destructively applying optical energy to the biological tissue at such a wave-length and at such power dissipation in the tissue as to cause the amount of optical energy absorbed and converted to heat to be within a range bounded by a minimum absorption rate at which tissue is converted to a collagenous substance and a maximum absorption rate at which the water in the tissue would boil, so as to cause proteinaceous elements of the biological tissue to denature.

4,672,970

ELECTRODE FOR LIVING BODY

Teruyoshi Uchida; Hisayoshi Yamamori, both of Nagoya; Hirotaka Kojima, Kasugai, and Junichi Tashita, Nagoya, all of Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 635,528, Jul. 30, 1984. This application Jul. 29, 1985, Ser. No. 760,115
Claims priority, application Japan, Jan. 31, 1985, 60-17528; Mar. 12, 1985, 60-49139
Int. Cl.[4] A61B 5/00
U.S. Cl. 128—635 **4 Claims**

1. A metal electrode for a living body, which comprises a noble metal wire and an insulating covering layer formed around the periphery of the noble metal wire, wherein at least a part of the portion of the insulating covering layer falling in contact with the noble metal wire is composed of a crosslinked epoxy resin, the outermost layer of hte insulating covering layer is composed of a polyurethane, either or both of the tip

end and a part of the side face of the noble metal wire is directly covered with a polyurethane porous membrane instead of the insulating covering layer, and said noble metal wire has

a layer of a transition metal formed around the periphery of the noble metal wire except where the noble metal wire is directly covered with the polyurethane porous membrane.

4,672,971

OXYGEN SENSOR

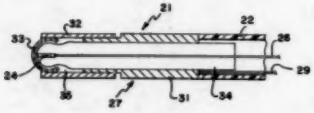
Josephus M. Otten, Miami, Fla., assignor to Sentron v.o.f., Roden, Netherlands

Filed Jun. 14, 1985, Ser. No. 745,271

Claims priority, application Netherlands, Jun. 21, 1984, 8401966

Int. Cl.[4] A61B 5/00

U.S. Cl. 128—635 **10 Claims**



1. A membrane-covered bipolar oxygen sensor for measurement of the concentration of oxygen in blood or other body fluids to be monitored, comprising:

an enclosure assembly containing an electrolyte and having an open end for contacting the fluid to be monitored;

an oxygen-permeable membrane that seals said open end of the enclosure assembly;

a cathode and an anode in contact with said electrolyte; and

said electrolyte includes a preferential cathode adsorption component that absorbs to the cathode in preference to adsorption to the cathode of an anaesthetic included within the fluid to be monitored, said preferential cathode adsorption component being present in said electrolyte at a concentration that is sufficient to substantially prevent adsorption of the anaesthetic to said cathode, said preferential cathode adsorption component being an inorganic salt having an iodide ion or a lithium ion.

4,672,972

SOLID STATE NMR PROBE

Howard R. Berke, 22055 McClellen Rd., Cupertino, Calif. 95014

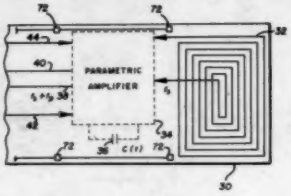
Continuation of Ser. No. 640,670, Aug. 13, 1984, abandoned. This application Sep. 10, 1986, Ser. No. 906,631

Int. Cl.[4] A61B 5/05

U.S. Cl. 128—653 **31 Claims**

21. A system for in vivo sensing of RF energy emanating from an organism exposed to an NMR scanner comprising:

means for receiving RF energy emanating from within an organism in response to said NMR scanner, said receiving means being dimensioned for insertion into said organism, said receiving means comprising means for generating an electrical signal having a strength and frequency related to the strength and frequency, respectively of said RF energy, the frequency of said electrical signal being greater than the frequency of said RF energy means for inserting said receiving means into an oriface in said organism and for localizing said receiving means at an



area of interest within said organism, said receiving means being incorporated within said inserting means.

4,672,973

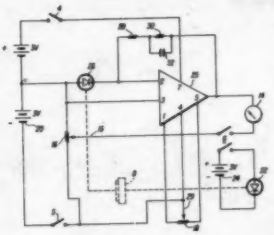
DEVICE AND METHOD FOR DETERMINING SKIN TYPE

Fred Hofke, East Greenville, Pa., assignor to Revlon, Inc., New York, N.Y.

Continuation of Ser. No. 472,781, Mar. 3, 1983, abandoned. This application Aug. 20, 1985, Ser. No. 767,078

Int. Cl.[4] A61B 5/00

U.S. Cl. 128—665 **16 Claims**



1. A device for determining the skin type of a living subject utilizing an oil sample taken from the skin of the subject and held on a probe capable of permitting light to pass therethrough, comprising:

means for impinging essentially monochromatic light on one side of said probe;

means for detecting that portion of the impinging light which is transmitted entirely through said probe, said detecting means producing an output current proportional to the amount of light detected;

means for displaying the skin type of said living subject as a function of said output current; and

slot means for receiving said probe, said means for impinging essentially monochromatic light and said means for detecting being located on opposite sides of said slot whereby said essentially monochromatic light passes through said probe without substantial deviation.

4,672,974

METHOD AND APPARATUS FOR "ZEROING" AND CALIBRATING A CATHETER-TIP GAUGE-PRESSURE TRANSDUCER

Arnold St. J. Lee, 1033 Hilts Ave., Los Angeles, Calif. 90024

Filed Jun. 14, 1985, Ser. No. 744,758

Int. Cl.[4] A61B 5/02

U.S. Cl. 128—673 **29 Claims**

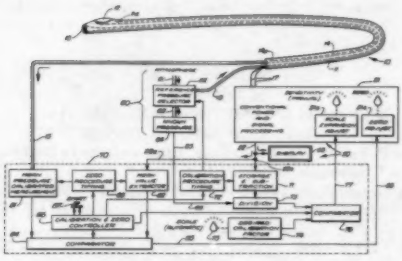
1. A method for first calibrating then zeroing a catherer-tip gauge-pressure transducer system having a pressure-sensitive diaphragm with a measurement side exposed to a pressure to be measured and a reference side normally exposed to atmospheric pressure, and haivng a display apparatus responsive to

the diamphragm to provide an indication upon a calibratable scale of the pressure to be measured relative to atmospheric pressure said method comprising the steps of:

(a) noting the pressure indicated by the display apparatus while the measurement side of the diaphragm is exposed to a pressure to be measured and the reference side of the diaphragm is exposed to atmospheric pressure; then

(b) substituting a known pressure for atmospheric pressure at the reference side of the diaphragm to produce a new pressure indication; then

(c) using the noted pressure indication of step (a), the known pressure of step (b), and the new pressure indication of step (b) calibrating the display apparatus scale in accordance with a calibration factor; then



(d) while establishing a constant reference pressure at the measurement side of the diaphragm, determining a mean value of the calibrated display-apparatus indication plus independently measuring a pressure substantially at the location of the reference side of the diaphragm; then

(e) calculating the difference between the independently measured pressure of step (d) and the calibrated display-apparatus indication of step (d); then

(f) adjusting the zero of the display apparatus in such a way as to cancel the difference calculated in step (e); therein the display apparatus is calibrated, and is also zeroed for operation while the constant reference pressure is at the measurement side of the diaphragm.

4,672,975

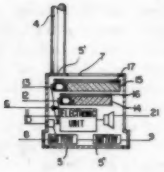
STETHOSCOPE WITH IMAGE OF PERIODICALLY EXPANDING AND CONTRACTING HEART

Vladimir Sirota, 130 W. 67 St., New York, N.Y. 10063

Filed Jun. 17, 1985, Ser. No. 745,684

Int. Cl.[4] A61B *7/02*

U.S. Cl. 128—715 **16 Claims**



1. A stethoscope, comprising

earphones; a tube; a body part connected by said tube with said earphones and having a passage for transferring sound from said body part to said tube; means forming a display in said body part; and electronic means forming on said display an image in the shape of a solid periodically expanding and contracting heart.

4,672,976

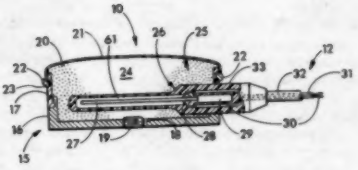
HEART SOUND SENSOR

Mark W. Kroll, Rogers, Minn., assignor to Cherne Industries, Inc., Minneapolis, Minn.

Filed Jun. 10, 1986, Ser. No. 872,514

Int. Cl.[4] A61B *7/02*

U.S. Cl. 128—715 **16 Claims**



1. A bio-acoustic signal sensing device for placement on the body of a patient to detect low frequency bio-acoustical signals and being for use with medical diagnostic devices, comprising:

a. a housing structure retaining the remaining elements of the device and having securement means for holding the device to the body of the patient, said housing structure having an open end for sound wave reception and a fluid ingress/egress aperture said open end having a horizontal dimension of at least 5 cm.;

b. hydrophone means spacially fixed within said housing structure for producing electrical signals in response to transmitted bio-acoustic signals;

c. flexible diaphragm means extended across said open end of said housing structure and having retention means to fix it thereacross, said diaphragm means being for placement in direct contact with the patient body surface, for conforming to the contours of the patient body surface and being vibratingly sensitive to the sound waves generated in the patient's body;

d. a bubble free fluid gel medium filling the remaining interior volume of said housing structure, said fluid medium transmitting sound waves from said diaphragm means to said hydrophone means; and

e. cable means communicatively connected to said hydrophone means for transmitting electrical signals from said hydrophone means to medical diagnostic devices.

4,672,977

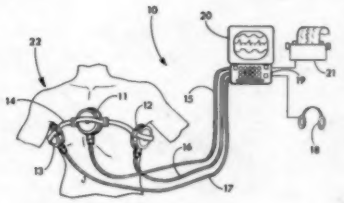
LUNG SOUND CANCELLATION METHOD AND APPARATUS

Mark W. Kroll, Rogers, Minn., assignor to Cherne Industries, Inc., Minneapolis, Minn.

Filed Jun. 10, 1986, Ser. No. 872,534

Int. Cl.[4] A61B *5/02, 7/00*

U.S. Cl. 128—715 **17 Claims**



1. A method for deriving low and high frequency heart sounds comprising the steps of:

a. detecting first and second acoustic signals from the thorax of a patient, said first acoustic signal being obtained from

the cardiac region and said second acoustic signal being obtained from an axillary region;

b. converting said first and said second acoustic signals to respective first and second output electrical signals;

c. automatically amplifying said second output electrical signal by a predetermined factor;

d. subtracting said amplified signal from said first output signal to thereby obtain a heart sound signal free of lung sounds;

e. detecting a phase difference in said output electrical signals by transmitting sound waves of predetermined frequencies into the patient, receiving said transmitted sound waves at the cardiac region and the axillary region, and producing electrical signals in response thereto; and

f. compensating for said phase difference by delaying said output electrical signal from the region which first produces an electrical signal in response to said transmitted sound waves to correspond with said output electrical signal from the second region.

4,672,978

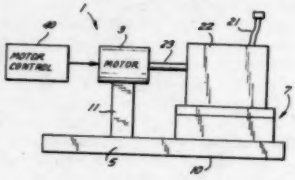
BRAIN STIMULATION OF BALANCE RESPONSE

Joseph Danto, 1088 Bromley Ave., Teaneck, N.J. 07666

Filed Oct. 17, 1984, Ser. No. 661,908

Int. Cl.[4] A61B *5/10*

U.S. Cl. 128—782 **18 Claims**



1. An apparatus for stimulating brain signals representative of a human subject's balance function, comprising:

means for supporting a human subject;

a moveable headrest adapted to be placed on said means for supporting, said headrest adapted to accommodate and support only the head of said subject;

means coupled to said headrest for causing it to move relative to the said means for supporting through an arc for a predetermined plural number of cycles to move said head relative to the body of said subject.

4,672,979

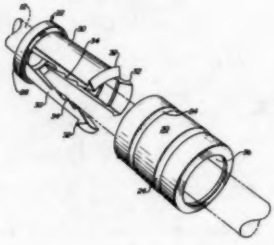
SUTURE SLEEVE ASSEMBLY

Peter J. Pohndorf, Miami Shores, Fla., assignor to Cordis Corporation, Miami, Fla.

Filed Jan. 30, 1986, Ser. No. 824,233

Int. Cl.[4] A61N *1/05*

U.S. Cl. 128—784 **6 Claims**



1. A suture sleeve assembly for placement around an elongated lead body, to anchor said lead body in position relative to the adjacent tissue, which comprises:

a tubular sleeve having a bore;

a collet member, said collet member defining a plurality of axially extending legs residing in the bore of the tubular sleeve, said legs having inner surfaces, the inner surfaces of said legs defining frictional gripping members to engage a lead body positioned within said sleeve assembly; and means for retaining said collet member in a position with said legs occupying the bore of the tubular sleeve; said retaining means including outwardly extending hook members defined on the collet member adjacent the free ends of said legs, and a retention flange on the end of said collet member opposed to said free ends, said tubular sleeve being proportioned to that the legs pass through said sleeve to permit the hook members to engage one end thereof, while the retention flange engages the other end of said sleeve.

4,672,980

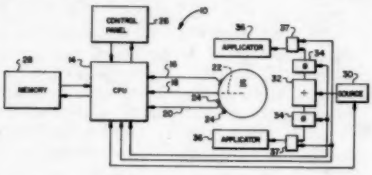
SYSTEM AND METHOD FOR CREATING HYPERTHERMIA IN TISSUE

Paul F. Turner, North Salt Lake, Utah, assignor to BSD Medical Corporation, Salt Lake City, Utah

Continuation-in-part of Ser. No. 136,506, Apr. 2, 1980, Pat. No. 4,462,412. This application Aug. 6, 1982, Ser. No. 405,947

Int. Cl.[4] A61N *5/00*

U.S. Cl. 128—804 **29 Claims**



1. A system for heating a target with electromagnetic radiation, comprising:

a control unit;

a power source coupled to said control unit, wherein the output frequency of said source is determined by said control unit;

a power splitter coupled to said source and having a plurality of outputs, wherein the energy supplied to each output is supplied simultaneously and has the same phase and power;

a plurality of individual applicators for radiating electromagnetic energy into the target wherein the electric field of the energy from each applicator is aligned with a common axis so that the electric fields of the respective applicators can overlap in a central region of said target to provide summation of the electric field energy within the central region for enhanced heating of the target;

a plurality of phase shifters coupled to the outputs of said splitter and to said control unit, wherein the phase of energy available at outputs of said phase shifters is determined by said control unit;

a plurality of switches coupled to the outputs of said phase shifters and to said applicators for controlling the amount of energy conveyed to said applicators;

at least one temperature probe coupled to said control unit and adapted for insertion into the target for indicating the temperature in selected regions of the target;

at least one electric field detector coupled to said control unit in the vicinity of the target for indicating the electric field strength in selected regions external of the taget, wherein the operation of said control unit varies as a function of the temperature and electric field indications;

memory means coupled to said control unit for storing data

generated during operation of the system, and for storing data generated prior to system operation, wherein the prior generated data is compared to the operating data by said control unit during system operation; and

means coupled to said control unit for displaying data generated during operation and for allowing an operator to control operation of the system.

4,672,981

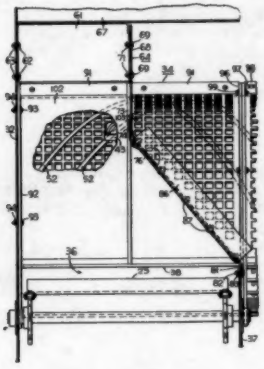
AXIAL FLOW CYLINDER CAGE WITH NONPERFORATED PORTION ABOVE THE FEEDER OPENING

Michael L. Huhman, Kansas City, Mo., assignor to Deutz-Allis Corporation, Milwaukee, Wis.

Filed May 8, 1986, Ser. No. 861,137

Int. Cl.[4] A01F *12/00*

U.S. Cl. 130—27 R **9 Claims**



1. An axial flow combine comprising:

a processor housing including top, front and rear walls and laterally spaced side walls,

a cylindrical cage within said processor housing extending axially between said side walls, said cage being spaced from said top, front and rear walls and having radial openings permitting passage of threshed material including seed,

a rotor coaxially mounted within said cage for rotation about a generally horizontal axis,

a radial feeder opening in the lower front half of said cage extending axially from one of said side walls a predetermined distance to a laterally inner edge,

a longitudinal feeder housing with a vertical longitudinal side wall generally aligned with and having a rear end terminating adjacent to said inner edge of said feeder opening,

a partition wall structure between said cage and said processor housing closing off a portion of the space in said housing disposed above said feeder opening, said wall structure extending from said one side wall an axial distance substantially less than said predetermined distance to a point at the top of said cage and thence extending to said vertical longitudinal side wall of said feeder housing,

said cage being void of radial openings in the area thereof closed off by said partition wall structure.

4,672,982

PROCESS FOR THE PRODUCTION OF A SMOKING MATERIAL FROM CIGARETTE MAKER WINNOWINGS AND APPARATUS

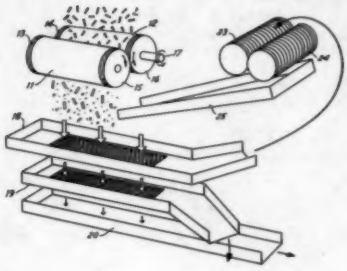
Peter Vigg, Andover, England, assignor to AMF Incorporated, Minneapolis, Minn.

Continuation of Ser. No. 574,111, Jan. 26, 1984, abandoned. This application Aug. 29, 1985, Ser. No. 770,380

Claims priority, application United Kingdom, Feb. 8, 1983, 8303412

Int. Cl.[4] A24B *5/02, 5/04, 5/16, 5/10*

U.S. Cl. 131—290 **11 Claims**



1. A process for converting cigarette tobacco winnowings into usable form for cigarette making comprising:

(a) crushing the winnowings, which have a moisture content compatible with cigarette making;

(b) effecting a first sieving operation on the resulting crushed winnowings;

(c) effecting a second sieving operation on the smaller fraction resulting from the first sieving operation to remove tobacco dust, thereby producing a usable fraction;

(d) cutting to desired size for cigarette making the larger fraction that did not pass said first sieving operation; and

(e) effecting a third sieving operation on said cut larger fraction that did not pass the first sieving operation.

4,672,983

HAIR COLORING

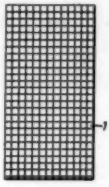
Narender K. Nath, and Monmohan K. Nath, both of 224 Shaftesbury Ave., London, England

Filed Oct. 2, 1984, Ser. No. 657,073

Claims priority, application United Kingdom, Oct. 3, 1983, 8326432; Nov. 3, 1983, 8329329; Nov. 7, 1983, 8329690

Int. Cl.[4] A45D *7/00*

U.S. Cl. 132—7 **10 Claims**



1. Means for performing a hair colouring treatment on a section of head hair, comprising a sheet of material capable of being folded around a section of hair to be treated together with a treatment material in paste or like form, characterised in that the sheet consists of plastics material which is re-usable, and in that at least one bendable inclusion in mesh, wire or strip form is embedded in or affixed to the plastics sheet material,

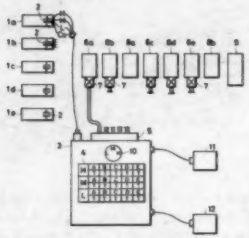
the bendable inclusion(s) having such bendability and rigidity that, when the sheet of plastics material is folded generally along predetermined fold lines over and about a section of hair to be treated with the treatment material applied thereto to form a generally closed pocket, the said inclusion(s) in bent form serve(s) to maintain the configuration of the pocket at least for a time sufficient to perform the colouring treatment.

4,672,984

ULTRASONIC WAVE CLEANING APPARATUS AND METHOD

Kunimi Ohhashi, Kanuma, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 4, 1985, Ser. No. 741,273
Claims priority, application Japan, Jun. 7, 1984, 59-117292
Int. Cl.[4] B08B *3/10*
U.S. Cl. 134—56 R **10 Claims**



1. An ultrasonic wave cleaning apparatus for cleaning articles of different kinds, said apparatus comprising:

carrying means for carrying articles to be cleaned, said carrying means having an identifying portion corresponding to the kind of article carried thereby to be cleaned;

signal generating means for detecting said identifying portion and for generating a signal corresponding to the kind of article to be cleaned;

a plurality of ultrasonic wave cleaning baths into which the article to be cleaned is sequentially immersed in a predetermined order;

ultrasonic wave oscillators each mounted on a respective one of said ultrasonic wave cleaning baths;

a first means for supplying an ultrasonic wave signal of a first strength to said oscillators for a first predetermined time period;

a second means for supplying an ultrasonic wave signal of a different strength than said first strength to said oscillators for a second predetermined time period; and

selection means for selecting one of said first and second supplying means on the basis of the signal from said signal generating means to apply an ultrasonic wave signal from the selected one of said supplying means to said plural oscillators.

4,672,985

BELT CLEANING APPARATUS

Larry D. Mohr, 5936 S. Dorsey La., Tempe, Ariz. 85282

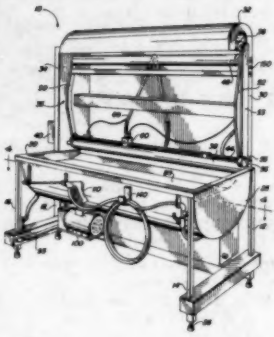
Filed Mar. 18, 1985, Ser. No. 712,734
Int. Cl.[4] B08B *3/02*
U.S. Cl. 134—57 R **6 Claims**

1. A belt cleaning apparatus for cleaning material from a surface of continuous wide sanding belts of various sizes independent of the sanding apparatus comprising:

(a) a belt drive assembly for receiving the wide belts, said belt drive assembly including drive means for rotating said belts for a predetermined time period;

(b) spray means adapted to reciprocate across a belt surface and to direct a spray of high pressure fluid toward the said surface, said spray means including sensing means for controlling the reciprocation of the spray means;

(c) tank means positioned subjacent said spray means adapted to receive the sprayed fluid and material discharged from the belt, said tank means including means



for separating the removed material from the fluid and means for recycling the fluid to said spray head; and

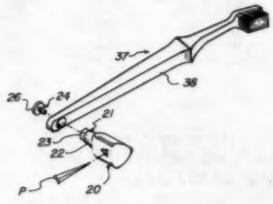
(d) tensioning means associated with said belt drive assembly for tensioning said belt on said drive means whereby belts of various sizes may be accomodated thereon.

4,672,986

TOOTHPICK HOLDER

Joseph Hadary, 5405 Linden Ct., Bethesda, Md. 20814

Filed Jan. 15, 1986, Ser. No. 819,112
Int. Cl.[4] A61C *15/00*
U.S. Cl. 132—90 **13 Claims**



1. A toothpick holder for holding a toothpick in different adjusted positions to facilitate access to different portions of the mouth, comprising:

an elongate handle having a shaped opening in one end thereof, said shaped opening having an entry portion and a polygonally shaped indexing portion formed therein; and

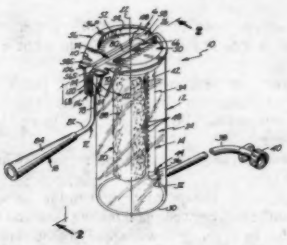
a toothpick retainer having a stem inserted into the shaped opening of the handle to hold the retainer to the handle in different adjusted positions, said stem having a portion shaped complementally to the entry portion of the opening in the handle and an indexing portion shaped complementally to the indexing portion of the opening in the handle, said stem being movable axially in the opening tc selectively place the indexing portion thereof into and out of the indexing portion of the opening, whereby when the indexing portions of the stem and opening are in mating engagement the stem is secured against rotational movement in the opening and when they are out of engagement the stem may be rotated in the opening to move the retainer to a different adjusted position.

4,672,987

DEVICE FOR CLEANING PAINT ROLLERS

Lloyd W. Brandt, 2303 E. Flower St., Phoenix, Ariz. 85016

Filed May 20, 1985, Ser. No. 735,999
Int. Cl.[4] B08B 3/02
U.S. Cl. 134—138 8 Claims



1. A device for cleaning a roller of a paint roller applicator, while the roller is rotatably mounted on a roller frame of the roller applicator, the cleaning device comprising:

a vertically oriented tubular housing having an open top through which the roller is inserted into the housing for washing and having an open bottom through which used washing fluid and material drain from the housing;

a sprayer assembly including a spray tube secured to an inner wall of the housing for directing a stream of washing fluid against the roller when the roller is disposed within the housing, to clean and rotate the roller on the roller frame; and

a cap for closing the top of the housing, the cap being further arranged to support the roller applicator such that the roller extends into the housing for washing, the cap having a first laterally opening slot through which a portion of the roller frame extends when the roller is disposed within the housing, and further having means for adjustably fixing the position of the roller frame with respect to the cap to orient the roller in a predetermined alignment with the fluid stream, wherein the means for adjustably fixing includes a first pair of spaced flanges extending downward from one side of the cap, the flanges being resiliently connected to the cap so that a gap between them narrows toward a bottom end of the flanges, a narrowest portion of the gap adjacent the bottom end being slightly closer together than a thickness of the roller frame of the roller applicator such that the first part of flanges move apart to receive and are resiliently biased toward one another to tightly grasp a first portion of the roller frame therebetween, wherein the first pair of flanges have serrated inward facing surfaces to enhance gripping of the roller frame by the first pair of flanges, wherein the cap further includes a second pair of substantially parallel flanges extending upward from an upward facing surface of the cap, to support a second portion of the roller frame on the upward facing surface of the cap, the second pair of flanges being disposed on either side of the first slot.

4,672,988

CONDUIT FLUSHING DEVICE

George Tash, 19438 Business Center Dr., Northridge, Calif. 91324

Filed Apr. 22, 1985, Ser. No. 725,900
Int. Cl.[4] B08B 9/02
U.S. Cl. 134—167 C 4 Claims

1. A conduit flushing device comprising:

(a) an expandable, tubular body having inlet and outlet portions, along with a mid-portion defining a chamber therein,

(b) said inlet portion adapted to be connected to a source of fluid under pressure,

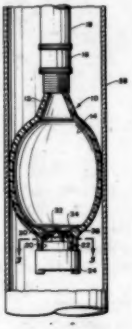
(c) a valve member having a lower portion, said lower portion being secured to the outlet portion of said tubular body,

(d) said valve member being secured to said tubular body solely at said lower portion,

(e) said lower portion of said valve member having at least one longitudinal opening extending therethrough through which fluid entering said chamber can pass out of said tubular body.

(f) said valve member having an upwardly directed extension therein, which extension terminates in a conical portion,

(g) said outlet portion having an inwardly directed, flexible seating projection adapted to contact and mate with the conical portion of said extension when the tubular member is in an at rest position to provide a positive horizontal



and vertically directed sealing force between the entire conical portion and said projection, to thereby prevent passage of fluid from said chamber past said projection,

(h) said outlet portion being sufficiently flexible to allow unfettered movement of said flexible seating projection out of contact with said extension when said chamber is sufficiently increased in size so as to allow the passage of fluid from said chamber, past said extension and through said opening.

(i) wherein the outside diameter of said conical portion is less than the outside diameter of said lower portion of said valve member, and wherein said longitudinal opening lies outside the periphery of said conical portion to enable substantially free flow of said fluid past said conical portion, through said opening and out of said outlet portion.

4,672,989

FLOW CONDITIONED NUTATION VALVING APPARATUS AND METHOD OF OPERATION

William W. Milburn, Jr., Boulder, Colo., assignor to Milburn Research Corporation, Boulder, Colo.

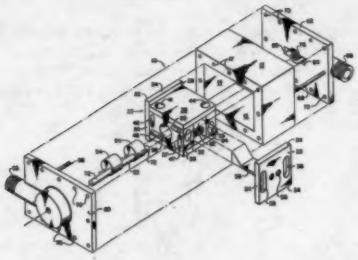
Continuation-in-part of Ser. No. 474,829, Mar. 14, 1983, Pat. No. 4,597,403. This application Jun. 11, 1986, Ser. No. 872,866
Int. Cl.[4] F02B 59/00; F16K 31/524
U.S. Cl. 137—1 19 Claims

15. A method for operating a nutating valving apparatus including at least one fixed plate having first and second faces and at least one channel extending between an opening defined in each said face with said opening in at least said second face having leading and trailing linearly extending edge portions, and at least one adjacent nutating plate having first and second faces and at least one channel extending between an opening defined in each said face, with said opening in at least said first face of said nutating plate having leading and trailing linearly extending edge portions, the method comprising:

incrementally opening the valving apparatus by moving each point of the nutating plate through a circle of nuta-

tion with the leading edge portions of said openings being maintained substantially parallel to one another so that the opening in the first face of the nutating plate incrementally at least partially overlaps the opening defined in the second face of the fixed plate;

flowing a fluid substance through said channels and conditioning the flow to reduce valve noise and turbulence during at least the initial portion of said incremental opening of said valving apparatus; and



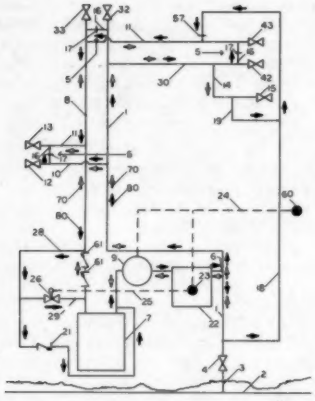
incrementally closing the valving apparatus by continuing motion of the nutating plate with the trailing edge portions of the openings in the first face of the nutating plate and the second face of the fixed plate being maintained substantially parallel to one another to position the opening in the nutating plate in a spaced, non-overlapping relationship to the opening in the fixed plate, whereby fluid flow is terminated by the sealing relationship of the fixed plate and nutating plate.

4,672,990

SYSTEM FOR FREEZE PROTECTION OF PIPES

Fred W. Robillard, 16706 Planchett Rd., Greenwell Springs, La. 70739

Filed Oct. 11, 1985, Ser. No. 786,671
Int. Cl.[4] E03B *7/12*; F16L *53/00*
U.S. Cl. 137—59 **6 Claims**



6. A system for freeze protection of pipes, comprising:

a. a cold water supply line, connected to a main water supply line at one end and to at least one cold water fixture at the other end;

b. a hot water tank having an inlet and an outlet;

c. a hot water tank inlet line, connected at one end to said cold water supply line, and at the other end to said hot water tank inlet;

d. a hot water supply line, connected to said hot water tank outlet at one end and to at least one hot water fixture at the other end;

e. at least one cold water branch line, connected to said cold water supply line at one end and to a cold water fixture at the other end;

f. at least one hot water branch line, connected to said hot water supply line at one end and to a hot water fixture at the other end;

g. at least one restrictive connection, connecting between one said cold water branch line or said cold water supply line and one said hot water branch line or hot water supply line;

h. a mixing tank, connected in-line in said hot water tank inlet line;

i. a circulating pump, connected in-line in said hot water tank inlet line between said mixing tank and said hot water tank so as to pump toward said mixing tank;

j. a first check valve, connected in-line in said hot water supply line so as to prohibit flow in said hot water supply line through said first check valve toward said hot water tank;

k. a by-pass line, connected at one end to said hot water supply line at a point between said check valve and said other end of said hot water supply line, and at the other end to said hot water tank inlet line between said hot water tank and said pump;

l. a shunt line, connected at one end to said said hot water tank, and at the other end to said by-pass line;

m. a remote valve, connected in-line in said hot water shunt line;

n. a second check valve, connected in-line in said by-pass line between said shunt line and said hot water tank inlet line so as to prohibit flow through said check valve toward said shunt line;

o. a first thermostat, positioned inside said mixing tank and connected to said remote valve so as to open said remote valve when the temperature of the water in said mixing tank reaches a desired low level and to close said remote valve when the temperature of the water in said mixing tank reaches a desired high level; and

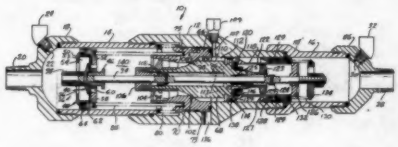
p. a second thermostat, connected to said circulating pump and said first thermostat so as to activate said pump and energize said first thermostat when the ambient temperature around said second thermostat reaches a desired level.

4,672,991

BACK FLOW PREVENTION VALVE

Edwin T. Badders, 3040 Riverside Drive Ter., Chino, Calif. 91710

Filed Apr. 1, 1986, Ser. No. 846,949
Int. Cl.[4] F16K *24/02*
U.S. Cl. 137—218 **16 Claims**



1. A pressure responsive valve assembly for use in a fluid flow line to prevent upstream flow therethrough, said assembly comprising a housing defining a fluid inlet and a fluid outlet, a control rod axially disposed within said housing, a piston carried by one end of said control rod, said piston being in sliding sealing engagement with said housing and inwardly

spaced from said fluid inlet, means within said piston for allowing fluid flow therethrough in response to a decrease in fluid pressure at said fluid outlet, a first valve member slidably mounted on said control rod and defining an upstream valve means and a downstream valve means, a second valve member slidably mounted within said housing and cooperating with said upstream valve means to form a first check valve, means for urging said first check valve to a closed position, a third valve member slidably mounted within said housing on said control rod and cooperating with said downstream valve means to form a second check valve, means for urging said second check valve to a closed position, and a reduced pressure zone disposed about a portion of said first valve member between said first and second check valves, said zone being sealed from said fluid inlet and said fluid outlet when said check valves are in the closed position, whereupon the fluid pressure in said zone is substantially less than the fluid pressures at said fluid inlet and said fluid outlet.

4,672,992

DIRECT DRIVE VALVE-BALL DRIVE MECHANISM

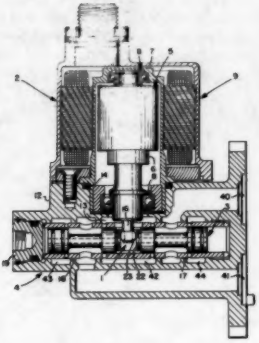
Robert D. Vanderlaan, and John W. Meulendyk, both of Kalamazoo, Mich., assignors to Pneumo Corporation, Boston, Mass.

Continuation of Ser. No. 682,536, Dec. 17, 1984, abandoned. This application Feb. 19, 1986, Ser. No. 830,918

The portion of the term of this patent subsequent to Mar. 4, 2003, has been disclaimed.

Int. Cl.[4] F16K *31/52*

U.S. Cl. 137—331 **10 Claims**



1. In combination, a valve assembly comprising a valve housing containing a longitudinal bore, and a valve member movable in said bore, a rotary force motor, and drive means between said rotary force motor and valve member for translating the rotary output of said rotary force motor to movement of said valve member within said bore, said drive means comprising an eccentric shaft rotatably driven by said force motor, said eccentric shaft being radially offset relative to the centerline of said force motor, said eccentric shaft extending substantially perpendicular to the longitudinal axis of said valve member, said valve member having a transversely extending cylindrical socket in which said eccentric shaft is received, said eccentric shaft having a ball-like member thereon, the outer diameter of said ball-like member being slightly less than the inner diameter of said cylindrical socket to prvoide line contact with a cylindrical wall portion of said cylindrical socket substantially completely around the entire inner diameter of said cylindrical socket, said line contact between said ball-like member and said cylindrical wall portion of said cylindrical socket being radially outward of the longitudinal axis of said valve member and radially inward of the outer diameter of said valve member and the inner diameter of said bore whereby the rotary output of said motor is translated into both linear and rotational movement of said valve member within said bore.

4,672,993

PLUG

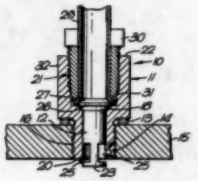
Vasil Bilak, Eschau, France, assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 21, 1985, Ser. No. 800,491

Claims priority, application United Kingdom, Nov. 23, 1984, 8429634

Int. Cl.[4] F16K *13/00*

U.S. Cl. 137—322 **4 Claims**



1. A plug for closing an opening in a container and for allowing connection of a pipe to the interior of the container, said plug comprising:

a socket member and a tubular member;

said socket member having

one end provided with first fastening means for securing said socket member to the container opening, and an opposite end;

a longitudinally extending through-aperture having a frusto-conical lip portion and a smooth inner first surface extending along at least part of its length from said socket member one end to said frusto-conical lip portion;

and a second surface including a threaded surface on the opposite side of said frusto-conical lip portion from said first surface and extending to said socket member opposite end for engagement with the threaded surface of a nut attached to the pipe to be connected to the container;

said tubular member having a hollow interior, said tubular member being positioned in said socket member through-aperture and having:

a closed end and an open end remote from said closed end;

a smooth outer side surface along at least part of its length including said closed end, said smooth outer side surface substantially corresponding in shape and diameter to said socket member through-aperture smooth inner surface;

at least one aperture in said smooth outer side surface adjacent said closed end, said at least one aperture communicating with the hollow interior of said tubular member;

and a frusto-conically shaped head portion at said open end adapted for sealing and force-transmitting engagement by the pipe as the nut is screwed to said socket member

for moving said tubular member relative to said socket member

from a first position in which said tubular member head portion one frusto-conical surface is axially spaced from said socket member frusto-conical lip portion and said tubular member at least one aperture is closed by a portion of said socket member through-aperture smooth inner surface

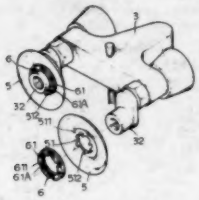
to a second position in which said tubular member head portion one frusto-conical surface is sealingly mated with said socket member frusto-conical lip portion, the pipe is sealingly engaged with said head portion other frusto-conical surface, and said tubular member at least one aperture is positioned outside said socket member through-aperture and thus establishes a passageway between the pipe and the container through the hollow interior of said tubular member.

4,672,994

FIXING COVER OF A WALLED FAUCET

Hsi-Chia Ko, 69, Lane 22, Chang Ting Rd., Lu Kang Chen, Changhua Hsien, Taiwan

Filed Apr. 15, 1986, Ser. No. 852,366
Int. Cl.[4] F16L *5/02*
U.S. Cl. 137—359 **2 Claims**



1. A tail fixing cover for a faucet to be bolted on a wall with bolting means extending as a rear side of said faucet, wherein

the tail cover formed of a metallic disk and has a medium ring provided in the middle thereof, the perimeter of the medium ring having an annular recess and the interior of the medium ring having a plurality of folding lugs;

an annular compression pad is provided in the form of a thick ring made of resilient rubber of plastic, with one side thereof molded to provide correspondingly arranged detent lugs spaced in an annular row with a groove in between adjacent pairs of the detent lugs;

the compression pad is compelled for entrance into the annular recess of the gap ring for coupling engagement, and the folding lugs are to be bent outwards to permit pinched closure onto the bottom of the grooves of the compression pad, to complete the setting of the compression pad, an inner side of each detent lug on the compression pad extending to secure resilient coupling with the bolting means on the rear side of the faucet,

by the reliable fitting of the tail cover to a surface of the wall is provided.

4,672,995

REDUNDANT PILOT VALVE CONTROL SYSTEM

Walter W. Powell, Sugarland, Tex., assignor to Anderson-Greenwood USA, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 687,017, Dec. 28, 1984, which is a continuation of Ser. No. 353,876, Mar. 2, 1982, abandoned.
This application Apr. 12, 1985, Ser. No. 722,698
Int. Cl.[4] F16K *31/38*
U.S. Cl. 137—489 **19 Claims**

1. A control system for controlling opening and closing of pressure actuated apparatus subject to a control pressure from the control system, which control pressure is responsive to line pressure furnished to the control system and the pressure actuated apparatus, the control system comprising:

(a) a valve housing including at least one inlet passage in fluid communication with the line pressure and an outlet passage in fluid communication with the pressure actuated apparatus;

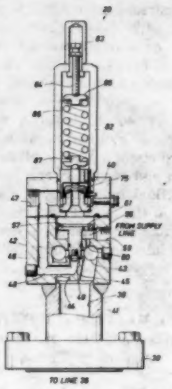
(b) at least two redundant valve actuators in fluid communication with said valve housing, each of said valve actuators forming control pressure supplied to the pressure actuated apparatus;

(c) means establishing fluid communication between each of said valve actuators and said outlet passage for forming a single output control pressure supplied to the pressure actuated apparatus for operation thereof; and

(d) wherein said valve housing includes, for each redundant valve actuator,

(1) a chamber having a piston therein with separate, opposing, different sized areas;

(2) means for introducing line pressure against the smaller of the different sized areas; and



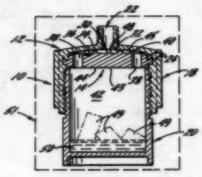
(3) means for introducing line pressure against the larger of the different sized areas of said piston.

4,672,996

SELF-REGULATING VALVE

Terry S. Floyd, Clover, S.C., and Wyatt P. Hargett, Jr., Matthews, N.C., assignors to CEM Corporation, Matthews, N.C.

Continuation of Ser. No. 722,266, Apr. 11, 1985, abandoned.
This application May 22, 1986, Ser. No. 868,171
Int. Cl.[4] F16K *15/14*
U.S. Cl. 137—522 **10 Claims**



1. A self-opening and self-closing relief valve for providing flow out of a closed system in response to a certain internal fluid pressure, said relief valve comprising

(a) a dome-shaped, pressure-deformable wall member having an outlet port, and

(b) an abutment integral with a support member therefor, said abutment being spaced apart from a center of said support member and having a circumferential peak adapted to surround said outlet port and forming a valve seal with an inside surface of said dome-shaped wall member when internal fluid pressure impinging on said dome-shaped wall member is insufficient to break said valve seal;

wherein said dome-shaped wall member is an integral part of a closure element, and said abutment support member has a peripheral wall surface that is adapted to interlock with, and that is in an interlocking relationship with, an inside wall surface of said closure element;

wherein said abutment support member comprises means for enabling internal fluid pressure impingement on said dome-shaped wall member, said impingement-enabling means being located between said abutment and said peripheral wall surface;

wherein said dome-shaped wall member comprises means for manual relief of internal fluid pressure, said means for

manual relief being a sleeve integral with said dome-shaped wall member, that extends said outlet port above said dome-shaped wall member;

wherein said dome-shaped wall member is sufficiently fluid pressure-deformable that said certain internal fluid pressure acting thereon, breaks said valve seal to permit outflow through said outlet port; and

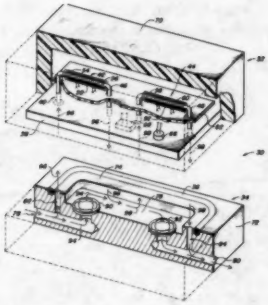
wherein the fluid pressure-deformed, wall member is sufficiently resilient that said valve seal is reformed when internal fluid pressure becomes less than said certain internal fluid pressure.

4,672,997

MODULAR, SELF-DIAGNOSTIC MASS-FLOW CONTROLLER AND SYSTEM

Donald Landis, Hollis, N.H., and John H. Fabricius, Westford, Mass., assignors to BTU Engineering Corporation, North Billerica, Mass.

Filed Oct. 29, 1984, Ser. No. 665,929
Int. Cl.[4] G01F *1/68*
U.S. Cl. 137—554 **18 Claims**



1. A modular, self-diagnostic mass-flow controller for controlling the mass-flow of a controlled gas along a main gas flow path, comprising:

first means for providing a first control signal proportional to mass-flow of the controlled gas along a first gas flow path parallel to said main gas flow path;

second means of providing a second control signal proportional to mass-flow of the controlled gas along a second gas flow path parallel to said main gas flow path; and

third means coupled to said first and to said second means for providing a third control signal in response to a preselected combination of said first and said second control signals for controlling the mass-flow of the controlled gas along said main gas flow path, and for providing a self-diagnostic alarm signal in response to a preselected characteristic of said first and said second control signals that indicates a operating state of the controller.

4,672,998

HYDRAULIC SWIVEL CONNECTOR

Michael A. Kozak, III, Encinitas, Calif., assignor to San Diego Gas & Electric, San Diego, Calif.

Filed Apr. 9, 1985, Ser. No. 721,193
Int. Cl.[4] F16L *37/28*
U.S. Cl. 137—614.04 **4 Claims**

1. A hydraulic swivel connector comprising:

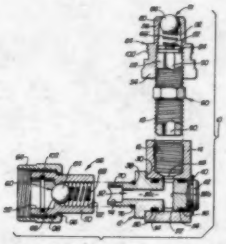
a generally cylindrical unitary, one-piece stem having a first end and a male second end which defines an aperture, said male second end being integral with the stem first end and having threads on the exterior of the male second end;

a block having a generally cylindrical cavity which defines an aperture in the block for receiving the first end of the stem, said block being adapted to sealingly rotate about the stem, said block further having a threaded bore which defines an aperture fluidically coupled to the block cavity;

a spring;

said stem further having a passageway including a shoulder for receiving an end portion of said spring, said passageway fluidically coupling the aperture of the male second end of the stem to the block cavity so that the stem end aperture is fluidically coupled to the block bore apreture;

a generally cylindrical female coupler member having a first generally cylindrical bore adapted to receive a male quick disconnect coupler, said female coupler member further



having a second generally cylindrical bore having interior threads adapted to threadably engage the threaded male second end of the stem, and a valve seat defining a passageway fluidically coupling the female coupler member first bore to the second bore; and

a movable member positioned in the female coupler member passageway and said spring being seated in the stem passageway, said end portion of said spring abutting said shoulder, and said spring biasing the movable member to sealingly engage the valve seat to close the female coupler member passageway when the male quick disconnect coupler is removed from the female coupler member first bore.

4,672,999

MIXING VALVE

Alfons Knapp, Biberach, Fed. Rep. of Germany, assignor to Masco Corporation, Taylor, Mich.

Continuation-in-part of Ser. No. 513,109, Jul. 12, 1983, Pat. No. 4,576,202. This application Aug. 23, 1985, Ser. No. 768,580
Claims priority, application Italy, Jul. 16, 1982, 67906 A/82; Jan. 28, 1983, 67096 A/83; Mar. 7, 1983, 67253 A/83
Int. Cl.[4] F16K *11/074*
U.S. Cl. 137—625.4 **3 Claims**

1. A flow control mixing valve characterized by

a housing structure;

said housing having a first port and second port;

each port having a radially outer arcuate shaped periphery of common radius with a common center point;

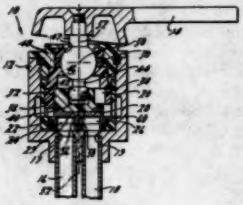
each port having a valve seat at an end thereof surrounding each port;

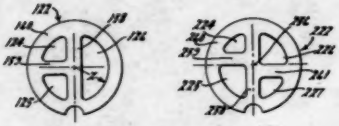
a movable circular valve plate having an arcuate periphery abutting said valve seat and movable to a closed position so that said plate has its arcuate periphery displaced radially outwardly of said arcuate periphery of each port;

said circular plate being slidably movable on said valve seat to an open position so that a portion of its arcuate periphery is selectively displaced radially inwardly from the respective arcuate periphery of said first, second, or both ports to uncover a portion of said first, second, or both ports in varying ratios;

a control means for slidably moving said movable plate over said valve seat and ports; and

each of said ports passes through a fixed plate, said fixed plate has at least one port for said first fluid and two ports





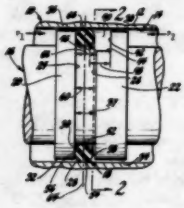
for said second fluid with said two ports for said second fluid divided by a bar that abuts said movable plate.

4,673,000

CHECK VALVE ASSEMBLY

Timothy A. Haerr, Enon, and Donald L. Parker, Middletown, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 18, 1986, Ser. No. 886,657
Int. Cl.[4] F16K *15/14*
U.S. Cl. 137—860 **7 Claims**



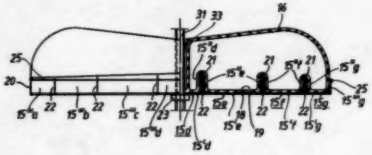
1. A check valve comprising a resilient rubber-like O-ring having inner and outer and first and second side circumference surfaces and defining a valve member, a valve support member having an annular groove therein in which said O-ring is received, and a cylindrical surface radially spaced from said valve support member to provide a fluid flow path therebetween under control of said check valve, said cylindrical surface being sealingly engaged by one of said O-ring inner and outer circumference surfaces concentrically of said annular groove, said annular groove having axially spaced first and second side walls and a bottom wall with said O-ring in full circumferential sealing engagement with at least one of said walls and with said cylindrical surface when said check valve is in the closed position, the resilient character of said O-ring providing force continually urging said O-ring to the check valve closed position, said first side wall being positioned to provide sealing support for said O-ring throughout its first side circumference surface when said O-ring is in sealing engagement with said first side wall, said second side wall having an arcuate portion thereof recessed axially and radially inwardly to be able to provide no sealing support for only an arcuate portion of said O-ring when said O-ring is positioned to otherwise have said O-ring second side circumference surface sealingly supported by said second side wall, and means moving said O-ring arcuate portion into said second side wall recessed portion and away from sealing engagement with said cylindrical surface against said resilient-character-urging force to open said check valve and permit fluid flow past said O-ring arcuate portion between said valve support member and said cylindrical surface, said resilient-character-urging force of said O-ring returning said O-ring arcuate portion to the check valve closed position when said moving means no longer acts on said O-ring arcuate portion in the valve opening direction.

4,673,001

SEALING MEMBER FOR A CONNECTION PIECE OR A SIMILAR CONNECTION PART FOR A CONDUIT FOR LIQUID OR GAS ON A CONTAINER

Chajkiel Pajes, Västerås, Sweden, assignor to AB Asea-Atom, Västerås, Sweden

Filed Sep. 30, 1985, Ser. No. 781,523
Claims priority, application Sweden, Oct. 1, 1984, 8404897
Int. Cl.[4] F16L *55/12*
U.S. Cl. 138—93 **6 Claims**



1. A foldable sealing device which, when in an unfolded condition, can be used to seal the interior of a connection piece that is attached to a steam generator in a nuclear power plant and which, when in a folded condition, can be inserted into the steam generator through a manhole leading therein, said sealing device comprising

a plurality of interconnected sheet elements, each sheet element including (1) a generally flat web part which defines a first surface, a second surface, at least one inner side edge and at least one outer side edge, and (2) an inner flange part which is connected to each inner side edge of said web part, each inner flange part extending generally perpendicularly with respect to said web part and away from said second surface thereof,

hinge means connected the adjacent flange parts of adjacent sheet elements such that said sheet elements can be pivoted relative to one another to cause the foldable sealing device to be in either a folded or an unfolded condition, the web parts of the sheet elements being shaped such that, when said sheet elements are pivoted relative to each other such that the foldable sealing device is in an unfolded condition, the first surface thereof will be aligned to form a generally flat surface, and

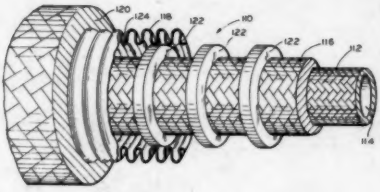
a bladder fixedly attached to the second surfaces of the web parts of said sheet elements, said bladder being inflatable to (a) cause said sheet elements, when the foldable sealing device is in a folded condition, to pivot relative to one another, thus causing the foldable sealing device to unfold into an unfolded condition, and (b) make contact with the wall of the connection piece and seal thereagainst when the foldable sealing device is positioned therein in an unfolded condition such that the flat surface thereof faces the steam generator.

4,673,002

FLEXIBLE FLUID FOR TRANSFERRING FLUIDS

John F. Scanlon, Roscoe; William D. Sherman, Genoa, and Joel E. Oman, Rockford, all of Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Jul. 30, 1985, Ser. No. 760,672
Int. Cl.[4] F16L *59/14*
U.S. Cl. 138—149 21 Claims



1. A flexible tube having a plurality of generally concentric tubular layers for transferring fluids under pressure at high temperatures, comprising:

an inner layer formed of a flexible material defining a fluid flow path for transferring fluids, said inner layer being sufficiently fluid permeable so as to causes said inner layer to be in a balanced fluid pressure condition when a fluid is being transferred through said tube;

a first intermediate layer formed of a flexible insulating material surrounding said inner layer, said first intermediate layer being sufficiently fluid permeable so as to cause said first intermediate layer to be in a balanced fluid pressure condition when a fluid is being transferred through said tube;

a second intermediate layer formed of a flexible material surrounding said first intermediate layer for containing fluids, said second intermediate layer being substantially fluid impermeable so as to cause said second intermediate layer to be in an unbalanced fluid pressure condition when a fluid is being transferred through said tube;

said insulating material causing fluid between said first and second intermediate layers to be at a lower temperature than fluid between said first intermediate layer and said inner layer, said fluid between said first and second intermediate layers being at a greater pressure than the pressure externally of said second intermediate layer; and

an outer layer formed of a flexible load resisting material surrounding said second intermediate layer for resisting fluid pressure, said outer layer structurally reinforcing said second intermediate layer to withstand the pressure of said fluid between said first and second intermediate layers so as to provide fluid pressure containment.

4,673,003

STOPPING MECHANISM FOR A GRIPPER SHUTTLE LOOM

Simon Goede, Wetzikon, Switzerland, assignor to Zellweger Uster Ltd., Uster, Switzerland

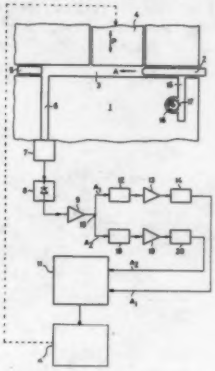
Filed Sep. 5, 1986, Ser. No. 903,756
Claims priority, application Switzerland, Sep. 6, 1985, 03863/85
Int. Cl.[4] D03D *51/40*
U.S. Cl. 139—342 18 Claims

1. A catching mechanism for a weft thread insertion device of a weaving loom, comprising:

a stopping channel including a receiving end for receiving said weft thread insertion device;

braking means for stopping said insertion device in said stopping channel; and

detector means for determining the position of the device in said stopping channel, said detector means including sensing means for subjecting the insertion device to an electromagnetic radiation signal in the microwave range and detecting a radiation signal reflected from said weft thread insertion device, said detector means operating on the Doppler principle to determine from the number of crossover points of the Doppler signal the position of the insertion device relative to a reference position.

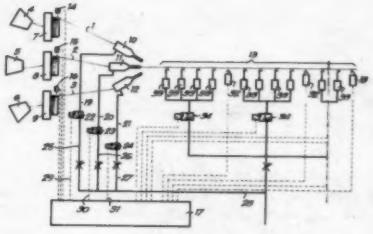


4,673,004

ADJUSTABLE CONTROL OF THE WEFT ON A WEAVING LOOM

Rik Rosseel, Ypres; Bernard Decock, Wevelgem; Marc Wyffels, Ypres, and Frank Ampe, Middelkerke, all of Belgium, assignors to N.V. Weefautomaten Picanol, Belgium

Filed May 14, 1985, Ser. No. 733,728
Claims priority, application Belgium, May 16, 1984, 2/60415
Int. Cl.[4] D03D *47/30*
U.S. Cl. 139—435 21 Claims

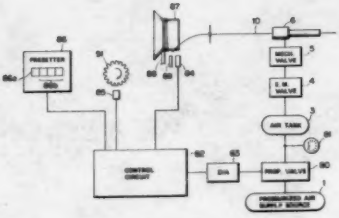


1. In an adjustable control for the weft thread of a weaving loom of the type in which, for each type of weft thread (1, 2 and 3), separate master jets (10, 11 and 12) are supplied with compressed air at an operating pressure suitable for the relevant weft thread, in which these master jets (10, 11 and 12) are supplied from separate supply drums (7, 8 and 9) with control units (14, 15 and 16) and in which auxiliary jets (33), which also operate with an adjustable operating pressure, are controlled according to a specific timing sequence, the improvement comprising means for measuring weft thread delivery made during the weaving process, said measuring means comprising at least one delivered weft thread sensor (32) located along the loom width and means (18) for sensing weft stop motion; and means for selectively controlling the control time and the duration time of the master jets in response to measurements of weft thread delivery made during the weaving process.

4,673,005
AIR JET LOOM

Mitugu Kawajiri, Iruma, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 20, 1985, Ser. No. 811,734
Claims priority, application Japan, Dec. 25, 1984, 59-271861
Int. Cl.[4] D03D *47/30*
U.S. Cl. 139—435 27 Claims



1. An air jet loom comprising:

a weft inserting nozzle through which a weft yarn is picked under a traction force of an air jet ejected from said nozzle;

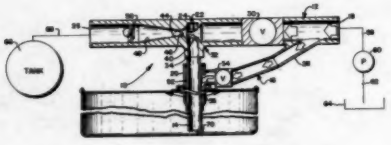
means for accomplishing a weft picking under said traction force at a first level during normal loom operation except at least when the loom is started; and

means for increasing said traction force to a second level not lower than said first level for a predetermined time at starting of the loom.

4,673,006
APPARATUS AND METHOD FOR REMOVING LIQUID FROM AND CLEANING A CONTAINER

Cleo T. Speck, Indianola, Iowa, assignor to Herschel Corporation (Delaware Corp.), Indianola, Iowa

Filed Aug. 12, 1985, Ser. No. 764,771
Int. Cl.[4] B65B *3/00*; B07D *5/54*
U.S. Cl. 141—1 13 Claims



12. A method for removing a first liquid from a container using apparatus for receiving and directing the flow of a second liquid, said apparatus having a first conduit with inlet and outlet ends, said inlet end being in fluid communication with a pressurizing source of said second liquid, said first conduit including a first on/off valve and means for creating a low pressure region, said apparatus further including second conduit in fluid communication with said first conduit, said second conduit having an open end, said apparatus still further including a bypass conduit and a sleeve, said sleeve surrounding a portion of said second conduit and having openings therein, said bypass conduit being in fluid communication between said first conduit and said sleeve and including a second on/off valve, said method comprising the steps of:

(a) placing the open end of said second conduit in said second liquid in said container;

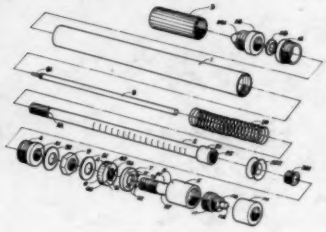
(b) opening said first on/off valve whereby second liquid is forced through said first conduit to create said low pressure region to draw said first liquid through said second conduit toward said low pressure region for mixing with said first liquid; and

(c) closing said first on/off valve.

4,673,007
AIR AND LIQUID PUMP FOR CUSHION SHOES, COMBINED A PRESSURE SCALE AND A BALL PEN

Ing-Chung Huang, No. 15 Reh-Her 1st Street, Kaohsiung, Taiwan

Filed Sep. 15, 1986, Ser. No. 907,457
Int. Cl.[4] B65B *3/04*
U.S. Cl. 141—95 10 Claims



1. A sort of air and liquid pump for cushion shoes combined with a pressure scale and a ball pen comprising,

a hollow bar which has its front end screwed with a cap that has a hollow hole at its center for a piston to penetrate through and its back end screwed with a matching ring that is successively screwed with a pressure measuring base by means of its interior thread that is to receive in order a rubber gasket, a nut, a rubber gasket, a measuring valve and a rubber gasket,

a piston which lies in said bar and can extend into or out of its front end; the interior of said piston is a hollow way which has a conical opening at its end for connecting with a one-way valve that is successively connected with a sponge and a sieve screen; the end of said hollow way is screwed with a hollow bolt so as to fix a two-way non-return cover at the end of said piston; the front end of said piston is screwed with a head base so as to fix the head of a pen rod received in said hollow way of said piston; a ring slot set at the edge of said piston connected with said head base is to receive a rubber ring that is then to be inserted in said cap for keeping said piston stay in place while said piston is not used,

a head base which is screwed at the front end of said piston and bored with air holes in it and set with thread on its outer surface for screwing with a tubular cover which has inner thread on its front part so as to connect a tube supplying gas or liquid,

a matching ring which is screwed at the end of said bar and set with thread on its inner surface for screwing with a pressure measuring base,

a pressure measuring base which is shaped as a tube with a smaller diameter for its front part and a bigger one for its back part; the end of the front part is set with thread for screwing with said matching ring; the front part is mounted in order with a gasket, a nut, a gasket, a measuring valve and a rubber ring; the interior of said base is a hollow way which has a conical opening at its middle for connecting with a one-way valve which is successevely assembled with a sponge and a sieve screen; the inner end of said hollow way is set with thread for screwing with a needle base; in the wall of the back part of said base, there is a reverse L-shaped air way which has its exit located at the front wall of the part with a bigger diameter that is also bored with three holes for receiving three pins on a rubber ring; in addition, the front part of said base where the measuring valve is to be assembled with is bored with two air holes communicating with said hollow way of said base,

a pressure measuring valve mounting on said pressure measuring base and having a hole at its center; the inner sur-

face of said hole is cut with a ring slot; an air way is bored in one side wall of said measuring valve leading to said ring slot and two other air ways are bored as well in the side wall with 90 degrees away from two sides of said air way and not communicating with said ring slot,

a rubber gasket set between said measuring valve and the front wall of the bigger part of said pressure measuring base and having a hole that is to face against said air way of said base and the three pins on its back surface that are to fit in said holes of said base,

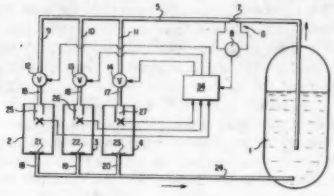
a needle base shaped as a hollow rod and set with thread on its surface for screwing with said pressure measuring base and a connecting ring; the center of the back wall of the needle base is set with a rod which is bored with four air holes; said connecting ring has interior thread for screwing with a needle or a tube valve, and having characteristics that when said measuring valve is rotated to make its air holes not face against said air way and said hole of said rubber gasket; said piston can move to and fro to push air and when said air hole of measuring valve is moved to face against said hole of said rubber gasket, inhaled air may run reversely into the interior of said bar so as to push out said piston for measuring the pressure; when one of said air ways is turned to face against said hole of said rubber gasket, the air can be released from said air way for decreasing the air pressure.

4,673,008

SYSTEM FOR CHARGING CONTAINERS WITH SOLIDS SUSPENDED IN A CARRIER FLUID

Daniel J. McDermott, Export, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 14, 1985, Ser. No. 765,467
Int. Cl.[4] B65B *1/04*
U.S. Cl. 141—198 **6 Claims**



1. A system for continuously charging containers of definite capacity with a flowable substance including solid material adapted to accumulate in the containers and a carrier liquid, comprising

(a) a first pipe;

(b) flow sensor means for detecting substance flow in said first pipe and for generating a first signal value representing a state of substance flow through said first pipe;

(c) a plurality of second pipes each communicating with said first pipe and arranged for receiving substance from said first pipe; each said second pipe having a charging outlet;

(d) a separate isolation valve in each said second pipe for allowing or blocking a flow of substance therein;

(e) means for removably attaching a separate container to the charging outlet of each said second pipe;

(f) means for removing the carrier liquid from each of the containers while accumulating the solid material therein;

(g) a separate level sensor means associated with each said second pipe for directly responding to a predetermined height level of the solid material accumulating in each respective container and for generating a second signal value when the solid material reaches said height level; and

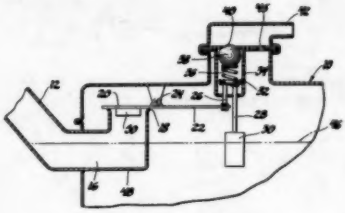
(h) control means, connected to said flow sensor means, said level sensor means and said isolation valves for maintaining the isolation valve of one of said second pipes open and that of another of said second pipes closed during generation of said first signal value and in a simultaneous absence of said second signal value from the level sensor means associated with said one second pipe and for shutting off the isolation valve of said one second pipe and simultaneously opening the isolation valve of said other second pipe during generation of said first signal value and upon commencing emission of said second signal value by the level sensor means associated with said one second pipe.

4,673,009

FUEL TANK VENTING

Roy A. Giacomazzi, Washington Township, Macomb County, and Gregory E. Rich, Richmond, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 27, 1986, Ser. No. 867,071
Int. Cl.[4] B65B *3/04*
U.S. Cl. 141—198 **2 Claims**



2. In a fuel tank having a vent orifice, a valve controlling flow through said vent orifice, and a filler neck terminating within the tank in an upwardly opening well, a vent actuator comprising a paddle overlying said well and having a pivoted arm extending adjacent said valve, said arm including an actuating member adapted to cause said valve to restrict flow through said orifice when fuel is not being introduced through said filler neck, said paddle and said arm pivoting to allow said valve to permit unrestricted flow through said orifice in response to introduction of liquid fuel through said filler neck, and a float having an actuating member adapted to cause said valve to restrict flow through said orifice when the level of liquid fuel in said tank approaches the maximum level desired.

4,673,010

INTERNAL EXPANSION WATERBED FITTING

Max H. Prufer, and James M. Prufer, both of 180 Advance Blvd., Bramalea, Canada L6T 4J4

Filed Jun. 10, 1985, Ser. No. 742,991
Claims priority, application Canada, Jun. 18, 1984, 456835
Int. Cl.[4] D65B *3/04*
U.S. Cl. 141—382 **16 Claims**

1. Waterbed filling unit:

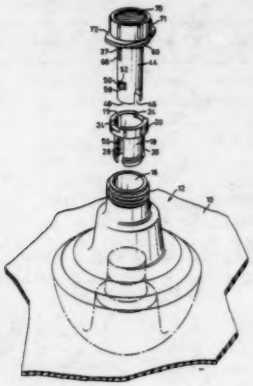
for use with a waterbed having a filler neck with a

an outer sleeve member for insertion in the bore of the filler neck of a waterbed, outer sleeve member having a leading and a trailing end relative to the insertion direction and being expandable transversely relative to said insertion direction,

an inner sleeve member designed for insertion into the bore of said outer sleeve member when the latter is located in the bore of said filler neck,

said inner and outer sleeve members being designed and dimensioned so that on said insertion of said inner sleeve member into said outer sleeve member, said outer sleeve member is expanded outwardly to form a seal with said

filler neck; and so that a seal is formed between said inner and outer sleeve members,



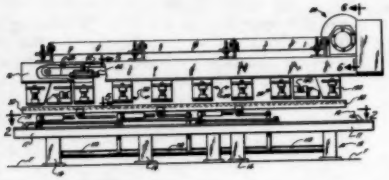
said outer sleeve member having means for coupling its outer end to a water supply or drain.

4,673,011

STAIRCASE STRINGER FABRICATING APPARATUS

James M. Lapeyre, New Orleans, and Christopher G. Greve, Covington, both of La., assignors to The Laitram Corporation, Harahan, La.

Filed Aug. 12, 1985, Ser. No. 765,371
Int. Cl.[4] B27C 5/00
U.S. Cl. 144—136 B 21 Claims



9. A staircase stringer fabricating apparatus for forming stair step positions on an elongated work piece, comprising:

a. an elongated frame supporting first and second guide surfaces which are angularly positioned with respect to each other during use;

b. staircase stringer work piece carriage means mounted to travel on the first guide surface for carrying a stringer work piece upon a guided path at least to a position adjacent the second guide surface;

c. a plurality of tool means, each mounted for travel on the second guide surface for preparing the work piece with a corresponding plurality of holders that define stair-step positions upon the work piece over a defined overall distance between end stair-step positions; and

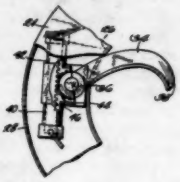
d. adjustable spacing means for selectively varying the overall distance, such as for various rise dimensions and a variable number of stair-step positions, so that the individual tool means and correspondingly the individual stair-step positions are equally spaced.

4,673,012

TOOL TENSIONING DEVICE FOR DEBARKING MACHINE

John A. O'Brien, Jr., 2133 Vestridge Dr., Birmingham, Ala. 35216, and James H. Hutson, Rte. 4, Box 925, Pell City, Ala. 35125

Filed Dec. 6, 1985, Ser. No. 805,885
Int. Cl.[4] B27L 1/00
U.S. Cl. 144—208 E 21 Claims



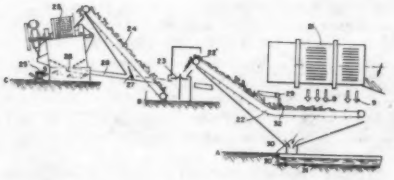
1. Apparatus for removing bark from a log, the apparatus comprising: a frame, a rotor having a longitudinal axis and being supported by said frame for rotation about said longitudinal axis of said rotor, said rotor including a central opening, means for causing rotation of said rotor about said longitudinal axis, means for feeding logs through said central opening of said rotor in the direction of said longitudinal axis, a plurality of debarking tools supported by said rotor for rotation about said longitudinal axis, said debarking tools being spaced apart circumferentially around said longitudinal axis of said rotor, a first one of said debarking tools being supported for pivotal movement with respect to said rotor about a first pivot axis and between an open position and a closed position, means for biasing said first one of said debarking tools toward said closed position, said means for biasing including a first hydraulic fluid motor, a first source of hydraulic fluid pressure operably connected to said first hydraulic fluid motor, and a second source of hydraulic fluid pressure operably connected to said first hydraulic fluid motor, a second one of said debarking tools being supported for pivotal movement with respect to said rotor about a second axis spaced from said pivot axis of said first debarking tool, said second one of said debarking tools being supported for pivotal movement between an open position and a closed position, and means for biasing said second one of said debarking tools toward said closed position, said means for biasing said second one of said tools including a second hydraulic fluid motor operably connected to said second one of said debarking tools, a third source of hydraulic fluid pressure operably connected to said second hydraulic fluid motor, and a fourth source of hydraulic fluid pressure operably connected to said second hydraulic fluid motor.

4,673,013

WOODROOM EFFLUENT TREATMENT SYSTEM

Timo T. Saalasti, Kelohongantie 9 A 53, 02120 Espoo, Finland

Filed Oct. 3, 1985, Ser. No. 784,259
Claims priority, application Finland, Mar. 7, 1984, 840940
Int. Cl.[4] B27L 1/00
U.S. Cl. 144—341 9 Claims



9. A method of barking wood comprising passing the wood

into a barking drum for barking, washing the barked wood with clean water, removing the bark onto a flight conveyor having a perforated bottom, carrying the bark on the flight conveyor into a shredder, carrying the bark from the shredder into a bark dewatering press;

wherein water separated by the shredder and by the press from the wet bark are passed onto the bark on the flight conveyor for filtration of fibers from the water.

4,673,014

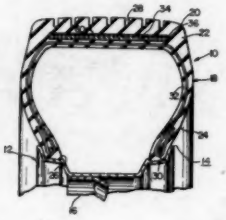
RUN-FLAT TIRE INCORPORATING TAPE-WRAPPED HELICAL COIL BAND AND METHOD OF FORMING

Edward G. Markow, Oakdale, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Jun. 6, 1985, Ser. No. 741,921

Int. Cl.⁴ B60C *17/00*

U.S. Cl. 152—156 **4 Claims**



1. A run-flat pneumatic tire comprising:

a casing with a tread portion in the crown threreof and sidewalls extending from the crown;

a prestressed helical coil having adjacently positioned windings located inside said casing, on the inside surface of the crown;

a strip of tape wrapped around the exterior of the coil and bonded thereto for ensuring permanent retention of the coil in a prestressed condition;

wherein the prestressing increases the fatigue life of said coil.

2. In a method for building a run-flat pneumatic tire having a casing with a tread portion in the crown thereof and sidewalls extending from the crown, the improvement comprising the steps:

stressing a helical coil to a final diameter less than that of its free diameter;

wrapping a strip of tape around the coil while the latter is in a stressed condition;

allowing a bonding agent to contact the tape and the windings of the coil; and

curing the bonding agent thereby permanently fixing the coil in a stressed condition; and

locating the wrapped coil inside the crown of the tire.

4,673,015

CHAIN NET

Olof I. Andreasson, Tegen 2535, S-458 02 Ödeborg, Sweden

Filed Jul. 12, 1984, Ser. No. 630,089

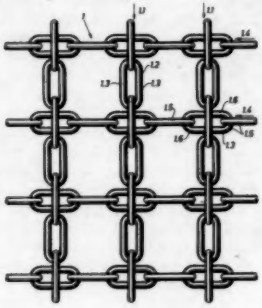
Claims priority, application Sweden, Jul. 26, 1983, 8304140

Int. Cl.⁴ B60C *27/06*; B21F *31/00*; B66C *1/12*

U.S. Cl. 152—231 **9 Claims**

1. A chain net comprising: a plurality of warp strands, each warp strand consisting of a plurality of interconnected warp chain links of an elastically deformable material capable of being deformed by a deforming force and resuming an initial shape after the deforming force is removed; a plurality of weft strands, each weft strand consisting of a plurality of interconnected weft chain links; at least some of said warp chain links forming intersections with at least some of said weft links, respectively; each intersection consisting of a weft link inserted into a warp link and locked to the warp link by elongation and deformation of the warp link, said warp chain links when subject to said deformation being larger than said weft chain links when said weft chain links are initially inserted through warp chain links to be surrounded thereby so that said elongation of said warp chain links makes said warp chain links when resuming the initial shape, small enough to lock around said weft chain links in the formed chain net, all of said warp chain links being the same in the formed chain net and all of said weft chain links being the same in the formed chain net.

5. A chain net comprising: a plurality of warp strands, each warp strand consisting of a plurality of interconnected warp chain links of a plastically deformable material capable of being deformed by a deforming force and assuming a final shape after the deforming force is removed; a plurality of weft



strands, each weft strand consisting of a plurality of interconnected weft chain links; at least some of said warp links forming intersections with at least some of said weft links, respectively; each intersection consisting of a weft link inserted into a warp link and locked to the warp link by elongation and plastic deformation of the warp link, said warp chain links being larger than said weft chain links when said weft chain links are initially inserted through warp chain links to be surrounded thereby so that said plastic deformation makes said warp chain links small enough to lock around said weft chain links in the formed chain net, all of said warp chain links being the same in the formed chain net and all of said weft chain links being the same in the formed chain net.

4,673,016

METHOD AND APPARATUS FOR LAYING A PNEUMATIC TIRE AROUND A WHEEL RIM

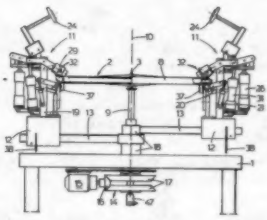
Cornelis C. Damman, and Jacob Plaatsman, both of Diemen, Netherlands, assignors to Holland Mechanics B.V., Purmerend, Netherlands

Filed Sep. 16, 1985, Ser. No. 776,743

Claims priority, application Netherlands, Sep. 17, 1984, 8402851

Int. Cl.⁴ B60C *25/08*

U.S. Cl. 157—1.24 **15 Claims**



1. A method for laying a pneumatic tire around a wheel rim

by means of at least one pair of mounting units, comprising the steps of:

bringing sliding members of a pinching sliding means of each mounting unit into engagement with both flanks of the tire, whereby the outer bead of the tire is locally urged over the adjacent rim edge;

placing an outer bead roll of each mounting unit against the rim edge;

moving the mounting units with equal speeds along the wheel rim in opposite directions through angles, which together form an angle of substantially 360 degrees thereby urging the remaining portions of the outer bead over the adjacent rim edge by rolling the outer bead rolls over said rim edge while stressing the tire with the pinching sliding means in a circumferential direction as a result of a braking action which is exerted on the tire by said sliding members, and simultaneously pinching the tire together and laying the tire in the rim bed;

inflating the assembled tire thereby bringing tire centering rolls into contact with the opposite flanks of the tire,

rotating the wheel rim for at least one turn in each way and positioning the tire centering rolls with respect to the tire in such manner that, during the rotation in one way, a friction force with an outwardly directed radial component is exerted on the tire by the tire centering rolls, whereby the tire is slightly pulled out of the wheel rim, and during the rotation in the other way, a friction force with an inwardly directed radial component is exerted on the tire by the tire centering rolls, whereby the tire is urged into the wheel rim.

5. Apparatus for laying a pneumatic tire around a wheel rim of a spoke wheel, comprising:

a table having means for supporting the spoke wheel in the apparatus;

at least one pair of mounting units movably connected to said table, the mounting units being movable with equal speeds in opposite directions along the wheel rim and together covering an angle of substantially 360 degrees;

each mounting unit comprising

a central support;

an outer bead roll rotatably mounted on an arm which is movably connected to the central support, the outer bead roll serving for laying the outer bead of the tire around the wheel rim;

a pinching sliding means having two adjustable sliding members connected to the central support with one sliding member positioned at a distance above the other sliding member, said sliding members including means for engaging opposite flanks of the tire and for stressing the tire in the circumferential direction and to pinch the tire in the rim bed when the outer bead of the tire is being laid around the wheel rim by the outer bead rolls;

tire centering rolls provided on said table, said tire centering rolls engaging the tire on the opposite flanks, the tire centering rolls being positioned so that they each make a small angle to the tangent of the wheel rim, which tangent extends through the point of the wheel rim lying closest to the center of the respective tire centering roll.

4,673,017

ADJUSTABLE MOUNT FOR ROLLER-TYPE AWNING

René Lauzier, Isere, France, assignor to Etablissements Lauzier, Bourgoin Jallieu, France

Filed Mar. 7, 1986, Ser. No. 837,503

Claims priority, application France, Mar. 12, 1985, 85 04057

Int. Cl.[4] E04F *10/06*

U.S. Cl. 160—22 **14 Claims**

1. An awning comprising:

a flexible awning panel having generally parallel upper and lower edges;

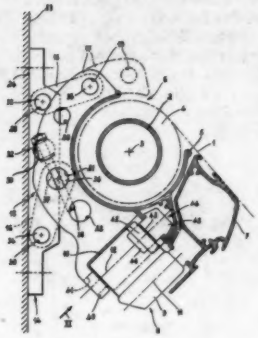
an elongated winder secured to the upper edge and extending along and rotatable about a longitudinally extending winder axis;

a stabilizer bar secured to the lower edge;

respective longitudinally spaced hinged arms having outer ends secured to the stabilizer bar and inner ends;

at least one mounting bracket adapted to be secured to a surface and formed with two transversely spaced and longitudinally extending bracket pivots;

at least one respective support engaged around the winder and supporting same and formed with a plurality of transversely spaced and longitudinally extending support pivots;



two links each having one end pivoted on the bracket at a respective one of the bracket pivots and another end pivoted on the support at a respective one of the support pivots, the links forming two opposite sides of a four-sided linkage and the support and bracket forming the other two opposite sides thereof; and

retaining means including a screw braced between the support and bracket and rotatable for relatively displacing same through positions angularly offset relative to each other relative to the winder axis and for locking the support and bracket against relative movement in any of the positions.

4,673,018

SUN BLIND

Ren S. Judkins, Salt Lake City, Utah, assignor to Verosol USA Inc., Pittsburgh, Pa.

Filed Nov. 13, 1984, Ser. No. 670,813

Int. Cl.[4] E06B *9/327, 9/30*

U.S. Cl. 160—84 R **34 Claims**

1. A sun blind for a window opening comprising:

first rail means disposed adjacent the top of the opening;

second rail means disposed adjacent the bottom of the opening;

third rail means disposed between the first and second rail means, the third rail means being movable between the first and second rail means;

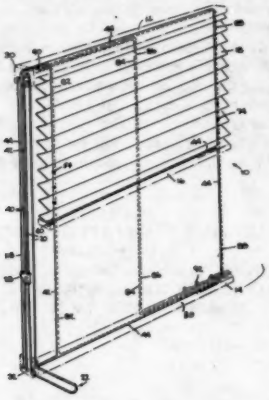
sun blinding means disposed between the first and third rail means and attached to the first and third rail means, the sun blinding means having a plurality of aligned apertures disposed therein;

first cord means disposed adjacent a side of the opening and being operable by an operator;

second cord means at least partially disposed adjacent the first cord means and further being disposed in the plurality of aligned openings in the sun blinding means for moving the third rail means in a direction perpendicular to a longitudinal direction of the third rail means;

means disposed on the first cord means adjacent the side of the window for adjustably coupling the first cord means to the second cord means, the coupling means including first and second plate means and means for releasably

fastening the first plate means to the second plate means, the second cord means being disposed between the first and second plate means and being frictionally maintained between the first and second plate means by the fastening means, said coupling means allowing said second cord means to be adjusted with respect to said first cord means,



whereby the longitudinal orientation of said third rail means with respect to a longitudinal orientation of said second rail means may be adjusted;

means disposed adjacent the side of the opening for guiding the first cord means; and

means for applying tension to the second cord means.

4,673,019

GARAGE DOOR SCREEN ENCLOSURE

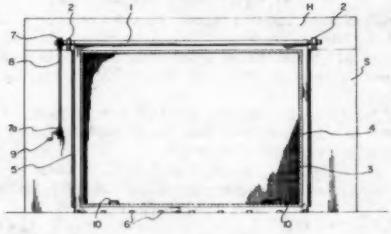
Daniel F. Silverthorne; Claude H. M. Hare, and Dale Hall, all of R.R. #9, Dunnville, Ontario, Canada N1A 2W8

Filed Feb. 27, 1986, Ser. No. 833,150

Claims priority, application Canada, Feb. 27, 1985, 475314

Int. Cl.[4] A47H *3/00*

U.S. Cl. 160—268 R **4 Claims**



1. A roll up apparatus comprising:

a rod having one edge of a flexible screen attached thereto,

means to rotatably mount the rod to a garage door frame,

the screen being provided with means to releasably attach its side edges to the side members of said garage door frame, and

means to maintain its bottom edge in contact with the ground when said screen is in a lowered position,

wherein one end of said rod is provided with a radially extending member for engaging a flexible drive member, and there is provided, on said garage door frame, beneath the radially extending member on said rod, a drivable member for engaging said flexible rod, to raise or lower said screen,

wherein the means for attaching the side edges of said screen to said garage door frame comprises complementary pairs of hook and pile fasteners, connected to said side edges of said screen, and said garage door frame respectively,

wherein the radially extending means on said rod comprises a pulley wheel, the driving means on said garage door frame comprises a second pulley wheel and the flexible driving means extending therebetween comprises and endless belt,

wherein said driving means mounted on said garage door frame is driven by a motor, and

wherein the means for maintaining the lower edge of said screen in contact with the ground comprisies a series of snaps sewn into the lower edge of said screen, therebeing a complementary series of snaps embedded in the ground at appropriate locations.

4,673,020

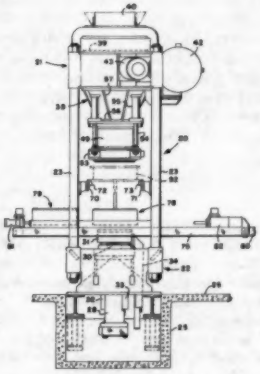
FOUNDRY MOLDING MACHINE AND METHOD

Edmond K. Hatch, Brecksville, Ohio, assignor to Equipment Merchants International Inc., Cleveland, Ohio

Continuation-in-part of Ser. No. 544,105, Oct. 21, 1983, abandoned, and Ser. No. 544,104, Oct. 21, 1983, abandoned. This application Mar. 29, 1985, Ser. No. 717,388

Int. Cl.[4] B22C *15/02*

U.S. Cl. 164—40 **52 Claims**



1. A foundry mold making apparatus comprising a frame, a flask, a pattern assembly, said flask and pattern assembly together defining a sand receiving cavity, a squeeze head mounted in said frame, and fluid operated lift cylinder means connected with said frame for lifting said pattern assembly and flask to squeeze sand in said cavity against said squeeze head, said pattern assembly including a well form with side walls which partially define said cavity, and a pattern plate closing the bottom of said cavity and telescopically movable within said well form between first and second positions to vary the depth of said cavity, and means for effecting relative movement between said well form and said pattern plate.

41. A method of making foundry molds including forming a sand receiving cavity by superimposing a flask on a well form and closing the bottom of the well form with a pattern plate which is telescopically received in the well form, lifting the pattern plate, flask and well form against a squeeze surface to compress initially the sand in the cavity from the squeeze surface, holding the flask and well form against movement relative to the squeeze surface while continuing to lift the pattern plate within the well form to effect a squeeze from the pattern plate, and thereafter lifting the well form and flask together with the pattern plate.

4,673,021

METHOD AND APPARATUS FOR CASTING ARTICLES

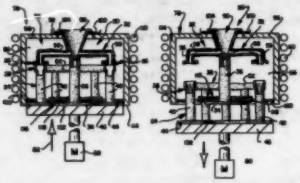
Lawrence D. Graham, Chagrin Falls; Richard A. Skelley, Minerva; Daniel G. Fetsko, Lyndhurst, and Ronald Ardo, Euclid, all of Ohio, assignors to TRW Inc., Lyndhurst, Ohio

PCT No. PCT/US86/00166, § 371 Date Mar. 21, 1986, § 102(e) Date Mar. 21, 1986

PCT Filed Jan. 28, 1986, Ser. No. 848,398

Int. Cl.[4] B22D *27/04*

U.S. Cl. 164—122 59 Claims



10. A method of casting a plurality of articles, said method comprising the steps of providing a plurality of article molds disposed in an array having an open central portion, providing a primary distribution system which is separate from the article molds, conducting a flow of molten metal from the primary distribution system to cavities in the article molds to fill the cavities in the article molds with molten metal, separating the article molds and primary distribution system by providing relative movement between the article molds and primary distribution system, retarding the transmission of heat from the article molds with a baffle plate disposed in the central portion of the array of article molds, and supporting the baffle plate from the primary distribution system during the relative movement between the article molds and primary distribution system.

4,673,022

ARRANGEMENT FOR THE CHANGING OF IMPLEMENTS IN FOUNDRY MACHINES

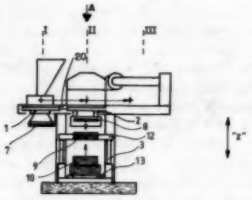
Horst Mitzner, Viersen, Fed. Rep. of Germany, assignor to Rheinische Maschinenfabrik Eisengiesserei Anton & Poper GmbH & Co., Fed. Rep. of Germany

Continuation of Ser. No. 668,305, Nov. 5, 1984, abandoned. This application Jun. 17, 1986, Ser. No. 876,645

Claims priority, application Fed. Rep. of Germany, Nov. 8, 1983, 3340267; Feb. 15, 1984, 3405420

Int. Cl.[4] B22C *15/24*; B22D *33/04*

U.S. Cl. 164—201 18 Claims



1. In combination with a foundry machine including a blasting unit, a hardening unit and a work station for supporting molds, an arrangement for changing said molds, the improvement comprising:

the foundry machine further includes

i. a slide carriage supported for horizontal reciprocating movement along a first axis, and

ii. means to lower and raise a first mold along a second vertical axis between the work station and an operating position;

the blasting unit and hardening unit are held by the carriage for horizontal movement along the first axis between first and second positions; in the first position, the blasting unit is located directly above the operating position of the first mold and the hardening unit is located forward thereof; and in the second position, the hardening unit is located directly above the operating position of the first mold unit and the blasting unit is located rearward thereof;

a changing station located outside and adjacent the foundry machine for holding a second mold; and

means for transferring the first mold from the work station to the changing station, and for transferring the second mold from the changing station to the work station.

4,673,023

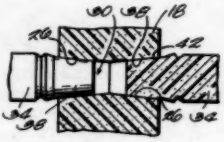
MULTIPART LOST FOAM PATTERN AND METHOD OF MAKING SAME

John H. Winston, Menomonee Falls, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Dec. 14, 1984, Ser. No. 681,960

Int. Cl.[4] B22C *7/02*

U.S. Cl. 164—246 13 Claims



1. A lost foam pattern including a first lost foam piece having a tapered inner surface defining an indentation, and a second lost foam piece received in said indentation and having a tapered outer surface in frictional engagement with said tapered inner surface, said first lost foam piece and said second lost foam piece being fixedly connected solely by virtue of said frictional engagement.

4,673,024

CONTINUOUS CASTING APPARATUS FOR THE PRODUCTION OF CAST SHEETS

Hakaru Nakato; Tsutomu Nozaki; Katsuo Kinoshita; Yasuhiro Habu; Hiroaki Ohnuma; Shigeru Ohmiya, all of Chiba, and Tomoaki Kimura, Hitachi, all of Japan, assignors to Kawasaki Steel Corporation, Kobe and Hitachi Ltd, Tokyo, both of, Japan

PCT No. PCT/JP84/00339, § 371 Date Feb. 28, 1985, § 102(e) Date Feb. 28, 1985, PCT Pub. No. WO85/00125, PCT Pub. Date Jan. 17, 1985

PCT Filed Jun. 29, 1984, Ser. No. 711,463

Claims priority, application Japan, Jun. 29, 1983, 58-116028

Int. Cl.[4] B22D *11/06*

U.S. Cl. 164—431 12 Claims

1. In a belt converging type continuous casting apparatus for the production of cast sheets comprising a combination of a pair of metal belts for supporting broad-side planes of the cast sheet arranged opposite to each other with circulatedly moving, and a pair of tapered fixed-type side plates for supporting narrow-side planes of the cast sheet each disposed between the metal belts in intimate contact therewith,

the improvement wherein said side plate has such a shape that a width 2D at molten metal level of the side plate, a width $2d$ and a converging angle θ at lower portion corresponding to the cast sheet thickness of the same side plate satisfy the following requirements:

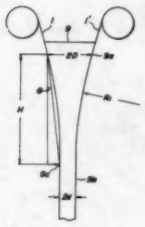
$d = 5$–30 mm

$D \geqq 60$ mm

$D/d \leqq 16$

$\theta \leqq 30°[\theta = \tan^{-1}(D-d)/H$ (wherein, H is a vertical distance from the molten metal level to the upper end of the portion of constant width 2d)]; and

said metal belt is used to have an yield strength Sy satisfying the following relations to a thickness t of the belt and a diameter Dr of a guide roll:



$Sy \geqq 10{,}500\ t/Dr$

$0.4 \leqq t \leqq 2.5$,

wherein

Sy: yield strength (kgf/mm^2)

Dr: diameter of the guide roll (mm)

t : thickness of the belt (mm).

4,673,025

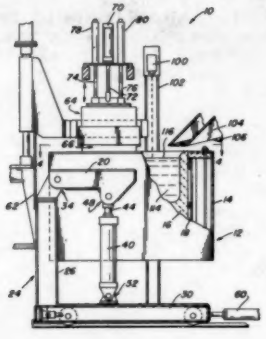
APPARATUS AND METHOD FOR MAINTAINING CONSTANT MOLTEN METAL LEVEL IN METAL CASTING

John H. Mortimer, Medford, N.J., assignor to Inductotherm Corporation, Rancocas, N.J.

Filed Apr. 4, 1986, Ser. No. 848,675

Int. Cl.[4] B22D *18/08, 18/06*

U.S. Cl. 164—457 **28 Claims**



7. Apparatus for providing a constant level of molten metal to a mold in gas permeable shell mold casting, comprising:

furnace means for melting and holding metal to be cast,

means for locating a mold to be filled in casting relationship with the molten metal in the furnace means,

means for causing molten metal to be drawn from the furnace means into the mold,

level sensor means for sensing the change in the level of the molten metal in the furnace means relative to the mold as molten metal is drawn into the mold, and

means responsive to the level sensor for moving the mold relative to the furnace to cause the position of the mold to remain constant relative to the level of the molten metal as the mold is being filled.

25. Method of providing a constant level of molten metal to a mold in gas permeable shell mold casting, comprising the steps of:

melting and holding metal to be cast in a furnace means,

locating a mold to be filled in casting relationship with the molten metal in the furnace means,

causing molten metal to be drawn from the furnace means into the mold,

sensing the change in the level of the molten metal in the furnace means relative to the mold as molten metal is drawn into the mold, and

tilting the furnace means relative to the mold in response to change in the level of the molten metal relative to the mold to cause the level of the molten metal to remain constant relative to the mold as the mold is being filled.

4,673,026

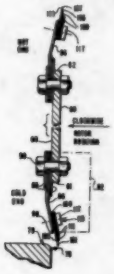
SEALING ARRANGEMENT FOR AIR PREHEATER

Donald K. Hagar, Emmaus; Curtis V. Kennedy, Whitehall, both of Pa., and Garnold Townsend, Waterford, Ohio, assignors to Eagleair, Inc., Bethlehem, Pa.

Filed Oct. 2, 1984, Ser. No. 657,010

Int. Cl.[4] F28D *19/00*

U.S. Cl. 165—9 **17 Claims**



1. A radial seal for an air preheater, the air preheater having a generally cylindrical drum portion containing a set of heat exchanging elements and a housing portion surrounding said drum portion, said air preheater portions being movable with respect to each other to effect exchange of heat between a gas discharge passage of a fuel burning device and an air intake passage thereof, one of said air preheater portions being for mounting a seal, the other of said air preheater portions including a sealing surface, the radial seal comprising:

(a) an elongated radial seal body which has a length and first and second side edges extending along said length, said radial seal body being for radial disposition with respect to the air preheater portions;

(b) said radial seal body including means, adjacent said first side edge, for rigidly and fixedly mounting said radial seal body with respect to one of said preheater portions;

(c) said second side edge of said radial seal body being a free, distal side edge, which side edge is disposed opposite said side edge whereby said radial seal body moves in response to irregularities in the sealing surface and irregularities between the first and second preheater portions to effect sealing therebetween;

(d) said radial seal body including a plurality of strips arranged in a stack, which stack has a bottom and a top, the stack including a strip at the bottom of the stack which bottom strip extends fully from said first side edge to said second side edge of said seal body, each strip having oppositely disposed edges and a pair of faces extending between said oppositely disposed edges, said stack being so arranged that at least one face of each strip is in contiguous face-to-face overlying engagement with a face of at least one other strip in said stack, each succeeding strip in

said stack after said bottom strip extending from said first side edge of said seal body toward but not completely to said second side edge of said radial seal body, certain of said succeeding strips extending toward said second side to a lesser extend than the strip therebelow in said stack so that said strips are disposed in a staggered, steplike arrangement;

(e) said seal body including means for allowing said bottom sealing strip to yieldably ride over the sealing surface of the other of the air preheater portions when the air preheater portions are moving relative to each other during operation of the air preheaters.

4,673,027

DEVICE FOR INSPECTION AND/OR REPAIR OF THE TUBES OF A STEAM GENERATOR FOR NUCLEAR REACTORS

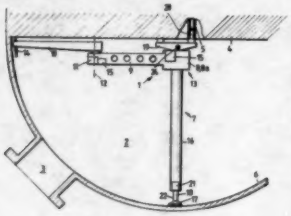
Huibrecht P. Vermaat, Rockanje, Netherlands, assignor to Brown Boveri Reaktor GmbH, Mannheim, Fed. Rep. of Germany

Filed Jun. 7, 1982, Ser. No. 385,922

Claims priority, application Fed. Rep. of Germany, Jun. 6, 1981, 3122660

Int. Cl.[4] B25J *9/04*

U.S. Cl. 165—11.2 **5 Claims**



1. Device for inspection of a nuclear reactor steam generator having at least one chamber wherein a tube bundle held in a tube sheet terminates, the chamber being formed with an opening to the interior thereof and having a bottom spaced from the tube sheets, comprising a manipulator insertible through the opening into the chamber, said manipulator being formed of two separate parts, one of said parts being a support leg and having means for adjusting said support leg in length in axial direction thereof and for extending said support leg between the bottom of the chamber and the tube sheet, and the other of said parts being an arm and having means for connecting said arm at an end thereof to said support leg so as to be movable relative thereto and so as to extend parallel to the tube sheet, an equipment carrier connected to and movable together with said arm, and means for rotating said equipment carrier relative to said arm via a drive element, each of said parts being separately insertible into the chamber and having respective means for coupling said parts to one another, said support leg carrying a combined lifting and rotation drive having means for vertically and rotatingly displacing said arm relative to said support leg, said support leg and said arm having respective swivel joints formed with means for detachably connecting a respective mounting rod to said support leg and said arm for manually assembling the manipulator.

4,673,028

AUTOMATIC THERMOSTATIC CONTROL SYSTEM FOR HEATER AND EVAPORATIVE COOLER

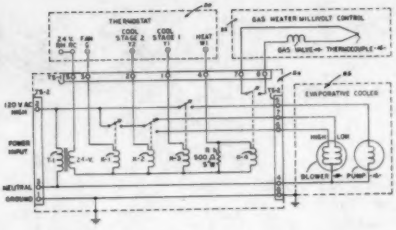
Bruce C. Meland, 14712 Otsego St., Sherman Oaks, Calif. 91403

Filed Aug. 19, 1985, Ser. No. 766,543

Int. Cl.[4] F24F *3/14;* **F28D** *3/00*

U.S. Cl. 165—19 **2 Claims**

1. An automatic control system for an evaporative cooler and an electrically-controlled heater, said cooler including an electrically driven water pump, and an electrically driven blower having a high speed winding and a low speed winding, said control system comprising; first, second, third and fourth relays, each having a winding, and each of the relays having a common terminal and normally open contacts, and the second of the relays further having normally closed contacts, the normally open contacts of the first relay being connected to the common terminal of the second relay and the normally open and normally closed contacts of the second relay being connected respectively to the high speed and low speed wind-



ing of the blower, and the normally open contacts of the third relay being connected to the water pump; and thermostatic control means connected to the windings of the four relays for causing the first and third relays to close their normally open contacts when ambient temperature reaches a pre-set threshold, for causing the second relay to open its normally closed contacts and close its normally open contacts when ambient temperature exceeds the pre-set threshold by a predetermined amount, and for automatically causing the fourth relay to close its normally open contacts and to activate the heater when ambient temperature falls below a pre-set threshold.

4,673,029

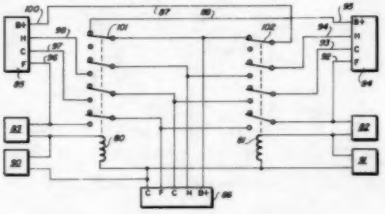
ZONED HEATING AND AIR CONDITIONING SYSTEM

Stephen A. Beachboard, P.O. Box 16448, Orlando, Fla. 32861

Filed Aug. 6, 1984, Ser. No. 638,244

Int. Cl.[4] F24F *3/00, 7/00*

U.S. Cl. 165—22 **3 Claims**



1. A zoned heating and air conditioning system comprising: a central air handling system having an air heating means and an air cooling means and a blower connected to an air duct system;

a plurality of thermostats each having heating and cooling set points, respectively associated with and located in different zones of a building; a plurality of dampers respectively associated with each said building zone positioned in the air duct system, each damper having an open position allowing air into the respective zone from said duct system and a closed position;

relay means for connecting one thermostat to said air handling system upon a call for heating or cooling by said one thermostat and disconnecting all other thermostats therefrom by connecting said one thermostat's connections

between the thermostat and said air handling system whereby only one thermostat is connected to the air handling system at a time and said relay means disconnecting said one thermostat from said air handling system after said one thermostat is satisfied;

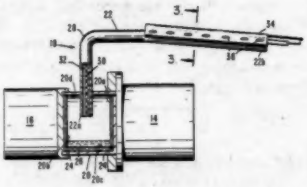
and damper actuating means for unlocking each damper in one building zone responsive to being actuated by a respective zone thermostat being connected to said air handling system by said relay means, said damper actuating means including a damper solenoid for each damper located adjacent each damper and connected to a respective zone thermostat to unlock each damper in one building zone responsive to being actuated by said respective zone thermostat and thereby unlock the dampers in one building zone zone when the one thermostat is actuated while preventing the dampers in another thermostat's building zone from unlocking.

4,673,030

RECHARGEABLE THERMAL CONTROL SYSTEM

Algerd Basiulis, Redondo Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Oct. 20, 1980, Ser. No. 198,903
Int. Cl.[4] F28D *15/00*; G05D *23/00*
U.S. Cl. 165—32 **11 Claims**



1. A rechargeable thermal control system for removing heat from a source thereof comprising:

a liquid reservoir thermally couplable to the heat source by means for receiving and retaining working fluid in thermal proximity to the heat source;

a heat pipe condenser and transport for the working fluid having first and second ends which respectively extend into and from said reservoir, said first end and said reservoir cooperating as a heat pipe evaporator, and a wick in and extending through said transport and spaced at said first end from said working fluid receiving and retaining means and essentially from wicking contact with said working fluid when in its liquid state;

thermally conductive means coupled to said second end for conducting heat from said heat pipe condenser to a heat sink; and

heat storage means having a thermal coupling to the heat source for absorbing heat therefrom and having a thermal coupling to said second end when said second end is at a temperature lower than said heat storage means.

4,673,031

VARIABLE SPEED INTEGRATOR

Douglas Wiemer, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 1, 1983, Ser. No. 547,439
Int. Cl.[4] B60H *1/00*; G05B *11/42*
U.S. Cl. 165—39 **11 Claims**

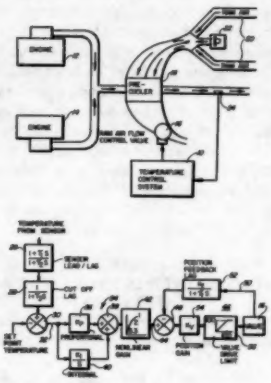
1. In a system for controlling a valve having a response time to regulate an amount of coolant flowing to a heat exchanger, the heat exchanger producing a cooled substance ouput at a temperature determined by the amount of coolant, means for controlling the response time of the valve comprising:

means for sensing the temperature of the cooled substance output from the heat exchanger to provide a signal representing the sensed temperature, the sensed temperature signal having a rate of change;

means for comparing the sensed temperature signal to a set point temperature signal to provide an error temperture signal;

means for integrating the error temperature signal, said integrating means having a variable gain;

means responsive to the integrated error temperature output from the integrating means for driving the valve into position;



means responsive to the sensed temperature signal for monitoring the rate of change of the sensed temperature to determine if the rate of change of the sensed temperature is less than a reference rate of change; and

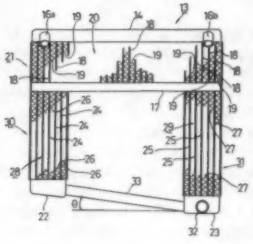
means responsive to said monitoring means for varying the gain of said integrating means, said gain varying means increasing the gain of the integrating means when the rate of change of the sensed temperature is less than the reference rate of change to decrease the response time of said valve.

4,673,032

RADIATOR AND OIL COOLING APPARATUS FOR MOTOR VEHICLES

Kunitaka Hara, and Yoshihiro Matsuo, both of Kawagoe, Japan, assignors to Honda, Wako, Japan

Division of Ser. No. 534,870, Sep. 22, 1983, abandoned. This application Dec. 10, 1985, Ser. No. 805,594
Claims priority, application Japan, Sep. 22, 1982, 57-166299; Sep. 22, 1982, 57-144535[U]; Sep. 22, 1982, 57-166298
Int. Cl.[4] B60H *1/10*
U.S. Cl. 165—44 **3 Claims**



1. Radiator apparatus for a motor vehicle comprising an engine and down tubes, said radiator apparatus being fastened

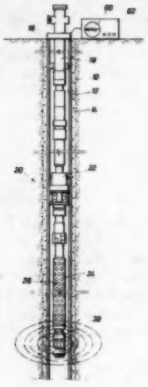
to the forward portion of said down tubes and comprising one upper radiator section and two lower radiator sections unitary therewith, said upper radiator section having at least one coolant supply opening connected to said engine, said lower radiator sections being connected to said upper radiator section, each of said upper and lower radiator sections having a core comprising cooling fins, said upper radiator section comprising an elongated, horizontally extending upper tank, a core and an elongated middle tank extending substantially parallel to said upper tank and connected thereto by tubing interspersed with cooling fins, said lower radiator sections comprising two lower tanks connected by a connecting pipe, upper portions of said lower tanks being connected to a lower portion of said middle tank by tubing interspersed with cooling fins, said tubing and said fins forming said cores of each of said lower radiator sections, one of said lower tanks being positioned at a lower level than the other of said lower tanks, said connecting pipe being inclined at an angle so selected that the flow speed of coolant in said lower radiator sections is substantially equalized a front portion of said engine being located above said connecting pipe and projecting into spacing formed between said middle tank and said cores of said lower radiator sections.

4,673,033

TUBING CONVEYED PERFORATING ASSEMBLY SAFETY DEVICE

John W. Minear, and Raymond J. McNiece, both of Houston, Tex., assignors to Delaware Halliburton Company, Duncan, Okla.

Filed Oct. 31, 1985, Ser. No. 793,431
Int. Cl.[4] E21B *43/11*
U.S. Cl. 166—55.1 **11 Claims**



1. Safety apparatus for use in tubing conveyed perforating gun assemblies having N shaped charges arranged to be fired in sequence and further including means for detonating the N shaped charges, comprising:

(a) a generally cylindrically shaped hollow housing member having an upper end and a lower end, said upper end adapted to be connected to a tubing string for conveyance into a cased well to be perforated and said lower end being provided with a chamber therein for housing a signal transmitter means for forming a signal which is coupled to the tubing string for transmission to the surface;

(b) surface means for detecting the signal from said signal transmitter and for providing indications thereof; and

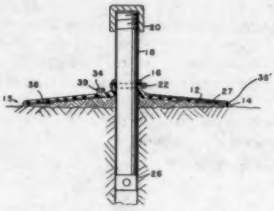
(c) means for interupting said signal transmitting means after the detonation of said N shaped charges.

4,673,034

CASED WATER WELLS HAVING FLEXIBLE PAD

Donald J. Hansen, 133 Elm St., Elkins, W. Va. 26241

Filed Jan. 6, 1986, Ser. No. 816,260
Int. Cl.[4] E21B *33/02*
U.S. Cl. 166—75.1 **10 Claims**



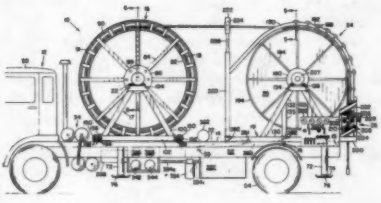
1. A device for preventing external liquid borne contaminants from entering the aquifer of a tubularly cased water well by channeling down around the outside of the casing, said device comprising a water impermeable flexible skirt which is peripherally continuous extending a substantial radial distance away from said casing, said skirt having an opening generally centrally disposed therein for removably receiving the upper terminus of a water well casing therethrough, and means for removably sealingly attaching said skirt to the outer surface of said wter well casing at a fixed location a substantial distance below said terminus.

4,673,035

METHOD AND APPARATUS FOR INJECTION OF TUBING INTO WELLS

Thomas C. Gipson, 5431 Callaghan Rd., San Antonio, Tex. 78228

Filed Jan. 6, 1986, Ser. No. 816,288
Int. Cl.[4] E21B *19/22*
U.S. Cl. 166—77 **14 Claims**



1. A tubing injector comprising:

a frame;

a subframe slidably mounted on said frame;

tubing storage means mounted on said subframe and having coil tubing stored thereon;

an injector reel rotatably mounted on said frame;

means for rotating said injector reel;

means mounted around a portion of the circumference of said injector reel for exerting pressure against the coiled tubing when the coil tubing is directed between said pressure exerting means and the circumference of said injector reel to provide positive engagement of said tubing by said injector reel when said injector reel is being rotated to pull said tubing off of said tubing storage means or return said tubing to said tubing storage means;

means for straightening said tubing; and

means for slidably reciprocating said subframe across said frame during the return of said tubing to said tubing stor-

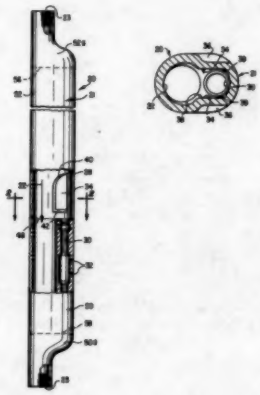
age means to distribute said tubing evenly on said tubing storage means.

4,673,036

SIDE POCKET MANDREL

David T. Merritt, Frisco, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Feb. 13, 1986, Ser. No. 829,088
Int. Cl.[4] E21B *23/03*
U.S. Cl. 166—117.5 **13 Claims**



1. A side pocket mandrel, comprising:

(a) an elongate body connectable in a string of well tubing and having a main bore therethrough and an offset belly portion intermediate its ends;

(b) receptacle means providing a receptacle bore in said elongate body opening upwardly into said belly portion, said receptacle being adapted to receive a flow control device therein in locking and sealing engagement therewith; and

(c) said body being formed with a pair of indentations in the external surface of said belly portion of said body providing a corresponding pair of internal deflectors extending upwardly from a point near the upper end of said receptacle bore and being spaced apart to form a keyway-like channel therebetween in alignment with said receptacle bore and being at least as wide as said receptacle bore but narrower than said main bore.

4,673,037

METHOD FOR SONICALLY LOOSENING OIL WELL LINER ENVIRONMENTS

Albert G. Bodine, 7877 Woodley Ave., Van Nuys, Calif. 91406

Filed Oct. 3, 1985, Ser. No. 783,460
Int. Cl.[4] E21B *31/00*
U.S. Cl. 166—249 **5 Claims**

1. A method for removing an oil well liner lodged in an earthen formation at the bottom of an oil well casing comprising the steps of:

lowering an elastic elongated column having a clamping tool attached thereto through said casing until said clamping tool is within said liner;

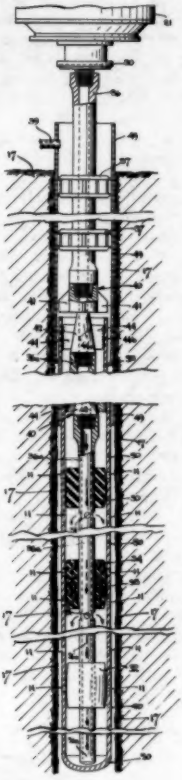
causing said clamping tool to tightly engage the liner;

said clamping tool having a column extension attached thereto which extends therebelow into said liner, said column extension having a plurality of annular elastic members spaced therealong;

coupling high level sonic energy to said column to cause longitudinal vibration thereof, said sonic energy being coupled through said clamping tool directly to said liner;

there being liquid within said liner between said annular members and slots formed in said liner providing fluid communication for said liquid between the inside and outside walls of said liner, sonic energy being transferred from said column liner extension to the liquid within said liner and through said liner slots to liquid along the outside surface of said liner, thereby sonically lubricating the outside walls of said liner while sonic energy is being applied directly to the liner;

when said liner is freed from the formation, drawing it out from said well.



4,673,038

GEL AND PROCESS FOR PREVENTING CARBON DIOXIDE BREAK THROUGH

Burton B. Sandiford, Balboa Island, Calif., and Roger C. Zillmer, Bloomington, Minn., assignors to Cities Service Oil and Gas Corporation, Tulsa, Okla.

Continuation-in-part of Ser. No. 623,917, Jun. 25, 1984, abandoned. This application Jan. 24, 1986, Ser. No. 822,120
Int. Cl.[4] E21B *33/138*
U.S. Cl. 166—270 **4 Claims**

1. A process for retarding the flow of carbon dioxide in carbon dioxide break-through fingers in a subterranean formation, said process comprising:

(a) introducing a gas selected from the group consisting of carbon dioxide and gases containing carbon dioxide into a subterranean deposit containing carbon dioxide break-through fingers;

(b) after said carbon dioxide break-through fingers have sorbed a predetermined amount of said gas, stopping the flow of said gas into said subterranean formation;

(c) after stopping the flow of said gas into said subterranean formation, introducing an effective amount of a gel-forming composition into said subterranean formation and into said carbon dioxide break-through fingers, said gel-forming composition being operable, when contacting carbon dioxide break-through fingers containing brine which has absorbed substantial amounts of carbon dioxide, to form a gel in said fingers which is operable for retarding the flow of said gas in said fingers, said gel-forming composition comprising

i. an aqueous solution comprising a first substance selected from the group consisting of polyvinyl alcohols, polyvinyl alcohol copolymers, and mixtures thereof, and

ii. an amount of a second substance selected from the group consisting of aldehydes, aldehyde generating substances, acetals, acetal generating substances, and mixtures thereof capable of crosslinking with the first substance through the formation of acetal crosslinkages, which is operable for effecting gelation of said gel-forming composition in said fingers after contacting said gel-forming composition with a brine which has absorbed substantial amounts of carbon dioxide, but which is inoperable for effecting gelation of said gel-forming composition in flow passages containing a brine which has not absorbed substantial amounts of carbon dioxide and which is also free of effective amounts of other crosslinking catalyzing substances, and

wherein said first substance is from about 0.5 to about 5% of the weight of said gel-forming composition, and wherein said second substance is from about 0.01 to about 2% of the weight of said gel-forming composition;

(d) allowing said gel-forming composition to contact said brine containing substantial amounts of absorbed cabon dioxide; and

(e) allowing a gel to form in said fingers of said subterranean formation which is effective for retarding the flow of said carbon dioxide-containing substance in said fingers.

4,673,039

WELL COMPLETION TECHNIQUE

Henry H. Mohaupt, 1151 Estrella Dr., Santa Barbara, Calif. 93110

Filed Jan. 24, 1986, Ser. No. 822,207
Int. Cl.[4] E21B *43/263*
U.S. Cl. 166—281 **20 Claims**

1. A method of completing a well in a productive subterranean formation comprising

drilling a bore hole into the earth and penetrating the formation;

running into the bore hole a casing string;

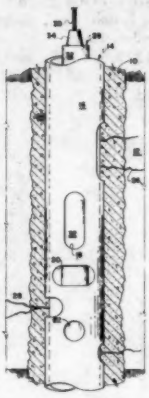
cementing the casing string in the bore hole by pumping cement downwardly through the casing string, allowing the cement to pass upwardly through an annulus provided between the casing and the bore hole and allowing the cement to set up;

at least partially filling the hole with a completion liquid;

opening perforations, through the casing string, aggregating a predetermined area;

running into the casing string a gas generating tool comprising a solid propellant charge of a size so that there is at least 14 square inches of open perforation area per cubic foot of propellant;

igniting the propellant charge; and



fracturing the formation by delivering the gaseous products produced through the perforations into the formation.

4,673,040

PERMEABILITY RESTORATION OF DAMAGED FORMATIONS

Robert D. Sydansk, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Filed Apr. 17, 1986, Ser. No. 853,305
Int. Cl.[4] E21B *43/25, 43/22*
U.S. Cl. 166—305.1 **22 Claims**

1. A process for improving oil recovery from a subterranean oil-bearing sandstone formation penetrated by a wellbore, said formation having a reduced permeability resulting from an encroaching fluid, comprising the steps of:

injecting a first damage-reversing treatment solution consisting essentially of at least one monovalent cationic salt and a solvent for said salt into said wellbore;

displacing said first treatment solution into said formation;

contacting said formation with said first treatment solution in a manner to restore an increased permeability to said formation;

injecting a second stabilizing treatment solution having a hydroxide-containing compound dissolved therein into said wellbore;

displacing said second treatment solution into said formation contacted by said first treatment solution;

contacting said formation with said second treatment solution to substantially maintain the increased permeability of said formation by substantially reducing the susceptibility of said formation to future permeability reduction from said encroaching fluid; and

thereafter recovering oil from said oil-bearing formation having the increased permeability.

4,673,041

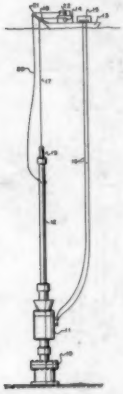
CONNECTOR FOR WELL SERVICING SYSTEM

William H. Turner, Chester, England, and Ivan K. Slaughter, Montrose, Scotland, assignors to Otis Engineering Corporation, Dallas, Tex.

Continuation-in-part of Ser. No. 663,476, Oct. 22, 1984. This application Feb. 14, 1986, Ser. No. 829,614

Int. Cl.[4] E21B *43/01*

U.S. Cl. 166—340 26 Claims



1. A system for conducting wireline operations in an underwater well comprising:

(a) lubricator stack means, connectable to the wellhead and having a wireline tool string therein, comprising:

a lower section including a remotely operable section connector member and means for connecting said lower section to a wellhead, an upper section including a remotely operable section connector member connectable to said lower section connector member, one or more lubricator sections and a remotely operable stuffing box

(b) a floating vessel having mounted thereon line winch means for lowering and raising said lubricator stack means, wireline winch means for operating said wireline tool string in the well, a source of pressured fluid; and

(c) control conduits for conducting pressured fluid from said source to one of said remotely operable section connector members and to said stuffing box.

17. A method for conducting wireline operations in an underwater well comprising the steps of:

(a) placing a wireline tool string in a lubricator stack including a wellhead connector, a remotely operable connector, at least one lubricator section and a remotely operable wireline stuffing box;

(b) passing a wireline through said stuffing box and connecting said wireline to said tool string;

(c) lowering the lubricator stack with line winch means from a floating vessel to an underwater wellhead;

(d) connecting the wellhead connector to the wellhead;

(e) raising and lowering the wireline with wireline winch means from said floating vessel to perform operations in the well;

(f) remotely operating the stuffing box to seal around the wireline;

(g) remotely operating the remotely operable connector to disconnect and reconnect said lubricator section and stuffing box from and to the wellhead connector to perform operations in the well; and

(h) disconnecting the wellhead connector from the wellhead and lifting said lubricator stack back to the floating vessel.

4,673,042

PNEUMATIC HAMMER

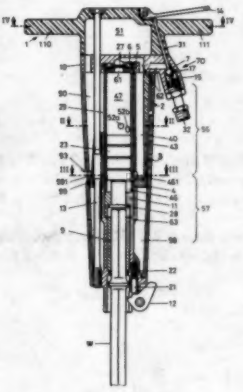
Heinz Steiner, Dörflingen, Switzerland, assignor to SIG Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland

Filed May 29, 1985, Ser. No. 739,090

Claims priority, application Switzerland, May 29, 1984, 2639/84

Int. Cl.[4] B23B *45/16*

U.S. Cl. 173—134 11 Claims



1. In a pneumatic hammer including a housing; a cylinder tube accommodated in the housing and having upper and lower length portions terminating in respective upper and lower ends; a cylinder head mounted in the housing and connected to said upper end of said cylinder tube for supporting said cylinder tube; an impacting piston received in an inner space of said cylinder tube for reciprocating motion therein; said piston dividing said inner space into an upper and a lower cylinder chamber; a pressure responsive distributor valve mounted in said cylinder head; pressurized air supply means for introducing externally pressurized air to said valve; first and second channel means extending within said housing and being connected to said valve and to said upper and, respectively, said lower cylinder chambers for alternatingly introducing pressurized air from said valve into said upper and lower cylinder chambers for driving said impacting piston back and forth; exhaust means for removing spent air from said upper and lower cylinder chambers to the ambient atmosphere externally of said pneumatic hammer; and a tool bit extending into said housing and being periodically impacted at least indirectly by said impacting piston; said exhaust means including first aperture means provided in said cylinder tube approximately at a mid portion thereof and second aperture means provided in said housing and communicating with said first aperture means; the improvement comprising a coupling cylinder mounted within said housing and at least partially surrounding said cylinder tube solely at said lower length portion thereof; a plurality of longitudinal ribs having lower ends integrally connected with said coupling cylinder and being free from connection to one another above the lower ends thereof; said longitudinal ribs extending parallel to said cylinder tube externally thereof and each having an upper end terminating at said cylinder head; said longitudinal ribs being circumferentially distributed about said cylinder tube and being in a longitudinal engagement with an inner surface of said housing and an outer surface of said cylinder tube for centering said cylinder tube relative to said housing; said longitudinal ribs defining and bounding first longitudinal chamber means being in communication with said first aperture means and second longitudinal chamber means communicating in series with said first longitudinal chamber means and further

communicating with said second aperture means; said first and second longitudinal chamber means forming part of said exhaust means; a transfer chamber formed in said housing and being separated from said first and second longitudinal chamber means by said cylinder head; and means for maintaining communication between said first longitudinal chamber means and said transfer chamber and between said second longitudinal chamber means and said transfer chamber.

4,673,043

HAMMER HAVING A PROTECTIVE COVER

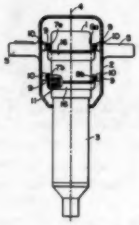
Martin Greppmair, Munich, Fed. Rep. of Germany, assignor to Wacker Werke GmbH & Co. KG, Munich, Fed. Rep. of Germany

Filed Dec. 23, 1985, Ser. No. 812,402

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1984, 3447401

Int. Cl.[4] E21B *3/00*

U.S. Cl. 173—162 H 8 Claims



1. A motor-driven hammer having an impact mechanism that is driven by said motor via a crank drive; said hammer has a protective cover that is provided with handgrips and is cushioned relative to the housing of the hammer, which has a longitudinal axis; when viewed in the upright position of operation of said hammer, said protective cover is spaced from, and covers, the top, both sides, and the front of said motor and crank drive, at least relative to an operator; said hammer further comprises:

two pairs of swing arms that extend on both sides of said housing between the latter and said protective cover for positively guiding said cover parallel to said longitudinal axis of said hammer; the swing arms of a given pair of said swing arms are disposed parallel to one another, and are spaced apart one above the other; each of said swing arms has two ends, one of which is pivotably mounted on said cover, and the other of which is pivotably mounted on said housing, with said pivotable mounting being effected by pivot means, at least some of which are embodied in the form of soft torsion spring means; said swing arms have a pivot range that is free except for the soft torsion spring means effect; and

stops for elastically delimiting said free pivot range of said swing arms; said stops cooperated resiliently in a cushioned manner, and are disposed on said housing of the hammer and said protective cover; said stops have a spring force with varying progressive spring characteristics that increases progressively from said free pivot range of said swing arms outwardly thereof.

4,673,044

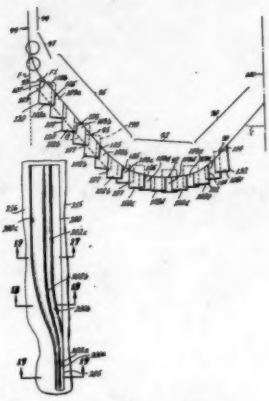
EARTH BORING BIT FOR SOFT TO HARD FORMATIONS

Louis K. Bigelow, Salt Lake City; Richard H. Grappendorf, Riverton, and Alexander R. Meskin, Salt Lake City, all of Utah, assignors to Eastman Christensen Co., Salt Lake City, Utah

Filed Aug. 2, 1985, Ser. No. 761,915

Int. Cl.[4] E21B *10/18, 10/50*

U.S. Cl. 175—329 22 Claims



1. A bit for use in earth boring and rotatable along an axis comprising:

a body member having a metal matrix curved surface which includes portions which include a flank, a shoulder and a nose which form a cutting surface, and including a gage,

said cutting surface including a plurality of channels forming pad means of matrix material between adjacent channels,

each said pad including a plurality of spaced synthetic polycrystalline diamond cutting elements mounted directly in the matrix during matrix formation,

each of said cutting elements being of a predetermined geometrical shape and being temperature stable to at least about 1,200 degrees C.,

each of said cutting elements including a front face having a predetermined surface area and portions adjacent to said front face,

at least some of the said cutting elements including a minor portion received within the matrix material of said pad and being so positioned that said one front face extends above the surface of said pad to form an exposed cutting face of said cutting element while at least two adjacent side portions are disposed such that one is adjacent to said pad and the other is spaced form said pad, said two adjacent side portions also having an exposed surface area,

said exposed cutting face of at least those cutting elements, located in the flank and shoulder of said body, having an exposed surface area of said front face which is greater than one half of said predetermined surface area of said one front face,

each of the said cutting elements including a surface portion generally to the rear of said cutting face,

matrix material contacting at least a portion of the said surface portion to the rear of said cutting face to form a matrix backing to support said cutting element,

said exposed surface area of the side portion of the cutting elements, which are located in said shoulder and flank and which is spaced from said pad, being greater than the surface area of the portion of said corresponding cutting element which is adjacent to said pad, and

the exposed portion of each of said cutting elements extending more than 0.5 mm above the surface of said pad,

all of said exposed surfaces of said element being thermally cooled by hydraulics,

each of said plurality of cutting elements being spaced apart from adjacent ones of said cutting elements to allow free hydraulic access to all of said exposed surfaces,

said plurality of cutting elements being arranged and configured in at least two radially distributed sequences, namely a first plurality of said cutting elements disposed in a first series of radially spaced-apart positions, and a second plurality of said cutting elements disposed in a second series of radially spaced-apart positions, said first and second series of cutting elements being radially offset one from the other so that at least one cutting element of said second series radially overlaps and is disposed azimuthally behind and radially between two corresponding cutting elements of said first series of cutting elements.

12. A bit for use in earth boring with a gage and rotatable along an axis comprising:

a body member including an outer curved surface,

a plurality of spaced cutting elements mounted in the said curved surface and extending thereabove for cutting the opposed formation,

means located in said body for effecting flow of fluid from the interior of said body to the exterior thereof,

said outer curved surface including a plurality of separated and radially extending channels to receive flow of fluid from said means in said body,

each of said channels including radial rib means therein for azimuthally directing the flow of fluid in said channel from the trailing side of the preceding cutter elements to the cutting side of the cutting elements, and

said rib means being a radial rib disposed in each of said channels, the thickness of said rib and depth of said channel varying from a minimum to a maximum as said gage of said bit is approached from the center of said bit.

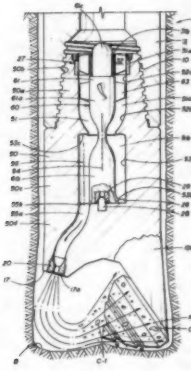
4,673,045
ENHANCED CIRCULATION DRILL BIT

Doyle W. McCullough, 26603 I.H. 45 North, The Woodlands, Tex. 77380

Continuation-in-part of Ser. No. 641,577, Aug. 16, 1984, Pat. No. 4,619,335. This application Aug. 4, 1986, Ser. No. 892,266

Int. Cl.[4] E21B *10/18, 10/60*

U.S. Cl. 175—339 12 Claims



1. An enhanced circulation drill bit adapted to be mounted at the end of a drill string for enhancing the removal of drill bit cuttings from the bottom of the borehole being drilled, comprising:

a drill body having a first body section adapted to be attached to a drill string and a second body section having mounted therewith a plurality of cone-type cutters;

said first body section having a bore therein adapted to be in fluid communication with the bore of the drill string to receive drilling fluid flowing downwardly through drill string;

said second body section having at least two passageways therethrough, each of said passageways having a first and a second end opening, said passageways being in fluid communication with said bore of said first body section at said first end opening and said passageways extending through said second body section to a second end opening;

flow response means mounted in said first body section bore for intermittently opening and closing said passageways in response to the flow of fluid entering said upper body section bore in order to intermittently deliver concentrated high velocity flow outwardly of said second end of a passageway to the end of the borehole to increase jet impact force and enhance cross circulation and removal of drill bit cuttings;

said flow response means including rotation means mounted with said first body section bore for rotating therein in response to fluid entering said bore and flow blocking means mounted with said rotation means and rotating therewith for intermittently blocking flow to said passageways as said rotation means rotates; and

pressure surge reflection means mounted with said bore of said first body section for substantially utilizing at least a portion of pressure surges within said bore created by said flow blocking means intermittently blocking flow to said passageways.

4,673,046
CONTROL SYSTEM FOR COMBINED WEIGHING APPARATUS

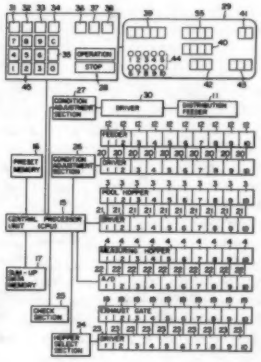
Yoshikazu Matsuura, Tokyo, Japan, assignor to Teraoka Seiko Company Limited, Tokyo, Japan

Continuation of Ser. No. 625,618, Jun. 28, 1984, abandoned. This application May 9, 1986, Ser. No. 862,197

Claims priority, application Japan, Jun. 30, 1983, 58-118724; Jun. 30, 1983, 58-118728

Int. Cl.[4] G01G *19/00, 19/22*

U.S. Cl. 177—1 9 Claims



1. A process for controlling a weighing apparatus having a plurality of measuring hoppers to select a combination of measuring hoppers having measured products with a total weight substantially equal to a set weight, comprising:

inputting data of said set weight and an allowable tolerance thereof to said weighing apparatus;

controlling the transfer of a predetermined weight of the product to each of said plurality of measuring hoppers;

sequentially calculating the total weight of preselected combinations of the weights of products in said plurality of measuring hoppers;

after calculation of each of said preselected combinations of the total weight, determining whether said total weight falls within said set weight and tolerance therefor;

continuing said sequential calculation and determination of the combined weight until a determination is made that a total weight is within said set weight and tolerance; and

collecting the product contained in each of said measuring hoppers comprising said combination having a total weight substantially equal to said set weight.

4,673,047

STRAIN GAUGE ASSEMBLIES

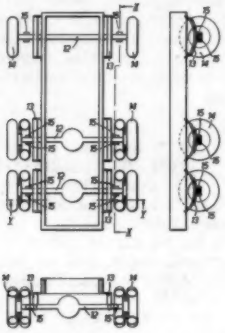
John Harbour, Chippenham, Great Britain, assignor to TRW Probe Electronics Co. Ltd., Gloucestershire, United Kingdom

Division of Ser. No. 616,956, Jun. 4, 1984, Pat. No. 4,626,041. This application Apr. 16, 1986, Ser. No. 852,421

Claims priority, application United Kingdom, Jun. 3, 1983, 8315346

Int. Cl.[4] G01G *19/08, 13/14, 3/14*

U.S. Cl. 177—136 **3 Claims**



1. A load measuring apparatus for use in measuring a vehicle load, the vehicle having a plurality of spaced apart parallel axles, each axle supporting a portion of the vehicle load at support locations on the axle, each end of each axle rotatably carrying an associated wheel, said apparatus comprising:

a plurality of first strain gauge bridge means, each end of an axle having an associated first strain gauge bridge means mounted to a front side of the axle and located between a support location and the associated wheel for generating an electrical signal indicative of shear strain in its associated axle;

a plurality of second strain gauge bridge means, each first strain gauge bridge means having an associated second strain gauge means mounted to a rear side of its associated axle and diametrically opposed thereto, each second strain gauge bridge means generating an electrical signal indicative of shear strain in its associated axle;

fuel measuring means for generating an electrical signal indicative of the quantity of fuel carried by the vehicle;

tare weight signal generating means for generating an electrical signal indicative of vehicle tare weight which includes the weight of the parallel axles; and

processing circuit means electrically connected to each first strain gauge bridge means, to each second strain gauge bridge means, to said fuel measuring means, and to said tare weight signal generating means for generating electrical signals indicative of (i) load on each wheel, (ii) load on each axle, (iii) total vehicle load, and (iv) vehicle payload.

4,673,048

SCALE DEVICES

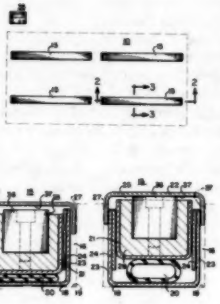
Barry D. Curran, West Lawn, Pa., assignor to Morgan Corporation, Morgantown, Pa.

PCT No. PCT/US85/01820, § 371 Date Nov. 15, 1985, § 102(e) Date Nov. 15, 1985

Continuation-in-part of Ser. No. 658,401, Oct. 5, 1984. This PCT application Sep. 23, 1985, Ser. No. 801,160

Int. Cl.[4] G01G *19/52, 5/04*

U.S. Cl. 177—146 **6 Claims**



1. A scale device carried in a recess in a floor for weighing various items which comprises

cover means for direct selective contact with said items to be weighed,

load responsive means to measure the weight of said items,

read out means connected to said load responsive means to indicate the weight of the items, and

pneumatic lifting assembly means for selective engagement with said load responsive means for transmittal of the weight of said items to said load responsive means.

4,673,049

WEIGHING DEVICE FOR WEIGHING WHEEL LOADS

Felix Scheuter, Bolligen, and Ernst Schindler, Mittelhaeusern, both of Switzerland, assignors to Haenni & Cie. AG., Jegenstorf, Switzerland

Filed Apr. 2, 1986, Ser. No. 871,762

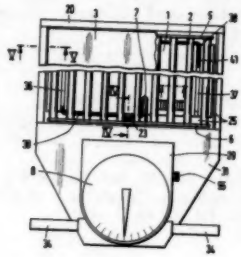
Claims priority, application Switzerland, Apr. 25, 1985, 1765/85

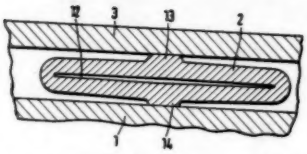
Int. Cl.[4] G01G *5/04*

U.S. Cl. 177—209 **10 Claims**

1. Weighing device, in particular a device for weighing wheel loads, comprising a platform (3) which distributes the load over a plurality of elongated hollow elements (2) consisting of springing material and in which the cavities (12) are filled with fluid and which communicate (7) with a measuring device (8) calibrated in units of weight, which measures the volume of fluid displaced from the cavities (12) in the hollow elements (2) under loading, characterized in that the cavities (12) of the hollow elements (2) are of split-shaped cross-section, are substantially parallel with the platform (3), the width of the split being so dimensioned that the inside faces of the

hollow elements (2) which define the split or gap (12) will at least partially abut each other when the weighing device is





overloaded, before the elasticity limit of the hollow elements (2) is reached.

4,673,050

FLUID-OPERATED TRANSPORTING CRAWLER-TYPE TRACK

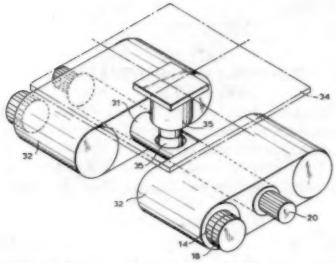
Christian Zschocke, Erdmannsdorf, German Democratic Rep., assignor to Akademie der Deutschen Demokratischen Republik, Berlin, German Democratic Rep.

Filed Sep. 4, 1985, Ser. No. 772,872

Claims priority, application German Democratic Rep., Sep. 5, 1984, 267122

Int. Cl.[4] B62D *55/08*; B60V *1/00*

U.S. Cl. 180—9.1 **7 Claims**



1. A fluid-operated transporting crawler-type track, comprising a bending-resistant and torsion-resistant stator; an endless, flexible and a fluid-and-pressure-tight belt stretched over an entire width of said stator, said stator including fluid-receiving and fluid-transmitting pressure-tight cells and passages uniformly distributed over the width of said stator, said passages connecting said cells with a bottom-side slide surface of said stator, said belt and said stator being spaced from each other to form there-between a gap which admits the fluid, said stator being formed with a collecting tank centrally positioned in said stator and with an inlet opening which connects said tank with said gap; side walls pressure-tight enclosing said stator at the sides thereof and being of the length smaller than the thickness of said belt, said belt having a slide layer facing said stator and having an outer surface facing said stator, formed of hydrostatic cells, said hydrostatic cells being open towards said stator and having elastic cell walls; non-rigid reinforcements inserted in said belt and connected with lateral support elements extended outwardly from said belt and forming a roller chain supported in a side wall of said stator; wheel disks engaged with said roller chain so as to rotate said belt and positioned outside of said stator; and a drive aggregate for driving said disks, said belt being at two sides thereof fluid-tightly connected to said side walls.

4,673,051

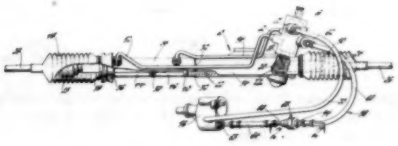
POWER STEERING GEAR WITH TWO-WAY CHECK VALVE

Richard S. Darling, Highland; Stanley R. Goodrich, Jr., Saginaw, and Alan D. Holzhausen, Frankenmuth, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 10, 1986, Ser. No. 837,826

Int. Cl.[4] B62D *5/08*

U.S. Cl. 180—132 **5 Claims**



1. A hydraulic power assist steering system for a vehicle comprising a power steering gear having a housing with a piston therein separating said housing into separate fluid pressure chambers and movable in response to a pressure differential applied across said piston for the hydraulic power assist steering of said vehicle, a rotary valve assembly associated with said steering gear for directing an exhaust pressure fluid to and from said chambers, input shaft means for actuating said rotary valve assembly, hydraulic pump means for supplying pressure fluid to said rotary valve assembly, and double acting valve means operatively disposed between said hydraulic pump means and said rotary valve assembly, said double-acting valve means including a first valve element movable between an opened position in which pressure fluid is supplied from said pump means through said valve means to one of said chambers and a closed position in which pressure fluid is blocked from back flow from at least one of said chambers back to said pump means to inhibit movement of said piston and thereby movement of said shaft means and blow off valve means associated with said first valve element and operable therewith in response to the exertion of the force of a predetermined pressure extending a predetermined force on said first valve element and said blow off valve means to allow pressure fluid to back flow from at least one of said chambers to said pump to reduce pressure buildup in said housing and thereby preventing pressure damage thereto.

4,673,052

MOTORCYCLE HOUSING EXHAUST SYSTEM

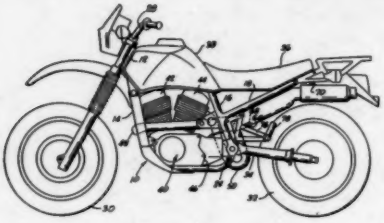
Takashi Shinozake, an` Satoshi Ishikawa, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 27, 1983, Ser. No. 536,250

Claims priority, application Japan, Sep. 29, 1982, 57-147827[U]; Sep. 29, 1982, 57-170215; Sep. 29, 1982, 57-147825[U]

Int. Cl.[4] B60K *13/04*

U.S. Cl. 180—219 11 Claims



1. A motorcycle comprising

a frame including a rear suspension mount and an upwardly and rearwardly extending back stay structure;

a V-type multicylinder engine having a front cylinder block and a rear cylinder block; and

an exhaust system including an exhaust pipe extending rearwardly to above said rear suspension mount from said front cylinder block and a muffler connected to said exhaust pipe above said rear suspension mount, said muffler extending upwardly and rearwardly adjacent said back stay structure, the rear of said muffler being fixed to said back stay structure.

4,673,053

FRAME-REAR SUSPENSION ASSEMBLY FOR A MOTORCYCLE AND THE LIKE

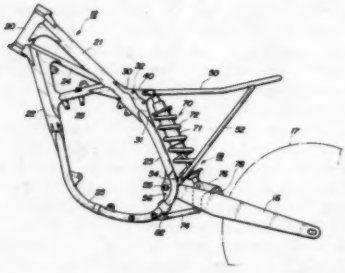
Osami Tanaka; Tomoyuki Tagami, and Kazuhiko Tsunoda, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 27, 1985, Ser. No. 813,695

Claims priority, application Japan, Dec. 28, 1984, 59-196994[U]; Dec. 28, 1984, 59-196995[U]

Int. Cl.[4] B62K *25/04*

U.S. Cl. 180—227 7 Claims



1. A frame-rear suspension assembly for a motorcycle and the like comprising a frame including right and left tubular members, a rear fork pivotally connected to said right and left tubular members and a cross member provided between said right and left tubular members, and a rear suspension system including a spring-loaded damper with one end pivotally connected to siad frame, and link means for connecting the other end of said spring-loaded damper to said rear fork, said cross member being detachably connected between siad right and left tubular members and said link means being connected to said cross member.

4,673,054

SAFETY BRAKE SYSTEM

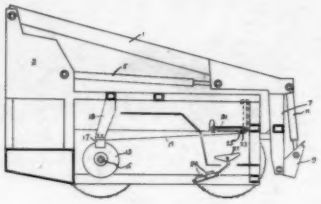
Raymond W. Burke; Herman W. B. Tiedke, and Brian C. Barton, all of New Brunswick, Canada, assignors to Thomas Equipment Ltd., New Brunswick, Canada

Filed May 14, 1985, Ser. No. 734,352

Claims priority, application Canada, May 15, 1984, 454319

Int. Cl.[4] B60K *28/00*

U.S. Cl. 180—271 12 Claims



1. A safety system for a vehicle having a parking brake and having foot-operated hydraulic controls, comprising:

a safety shield mounted on said vehicle for motion between an upright position which provides access to said hydraulic controls and a lowered position in which said shield covers said hydraulic controls and provides a generally horizontal foot rest; and

means connecting said shield to said parking brake to operate said parking brake so that when the shield is in its lowered position the parking brake is set and the shield covers the hydraulic controls of the vehicle so as to be usable as a foot rest and when the shield is in its upright position, the parking brake is released and access to the hydraulic controls is available, whereby the shield prevents accidental operation of the hydraulic controls when an operator is entering or leaving the vehicle by way of the foot rest.

4,673,055

TRANSMISSION FOR SELF-PROPELLED WORKING VEHICLES

Kojiro Yamaoka, Nishinomiya, and Hideaki Okada, Takarazuka, both of Japan, assignors to Kanzaki Kokyukoki Mfg. Co., Ltd., Amagasaki, Japan

Filed May 20, 1986, Ser. No. 865,113

Claims priority, application Japan, May 28, 1985, 60-79886[U]

Int. Cl.[4] B60R *17/00*

U.S. Cl. 180—336 7 Claims

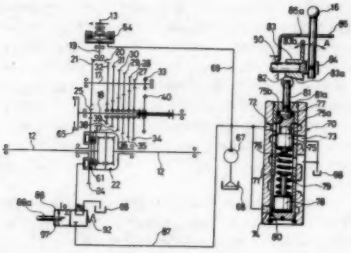
1. In a transmission for self-propelled working vehicles, having a speed change mechanism which comprises: a plurality of first change gears fixedly mounted on a first shaft; a plurality of second change gears rotatably mounted on a second shaft, said second shaft being arranged in parallel with said first shaft and said second change gears being meshed with said first gears, respectively; key means disposed within said second shaft and slidable axially of the said shaft, said key means having a clutch portion biased to move radially outwardly of said second shaft and engageable with each of said second change gears so as to connect same non-rotatably to said second shaft; and a shift mechanism operatively connected to said key means for displacing same to a plurality of operative posi-

tions where said second change gears are coupled one at a time to said second shaft by said clutch portion, said shift mechanism including a change lever for operating same, the improvement comprising:

a fluid-actuated clutch operable to interrupt input of power to said speed change mechanism when disengaged;

a pump connected to said clutch via a fluid supply path for supplying fluid under pressure so as to engage said clutch;

relief valve means connected to said fluid supply path and having a spring for determining fluid pressure applied to said clutch, a base end of said spring being received by a control piston movable axially of said spring between two positions,



said control piston being adapted to be moved towards said spring by fluid supplied from said fluid supply path through an orifice; and

an unloader valve connected to said fluid supply path and operable to unload fluid pressure in said fluid supply path when displaced to a pressure-unloading position,

said change lever being supported so as to be movable along a first direction and along a second direction, said unloader valve being connected operatively to said change lever so as to be displaced to said pressure-unloading position by a movement of said change lever along said first direction, and said shift mechanism being adapted to be operated when said change lever is moved along said second direction.

4,673,056

LOUDSPEAKER SYSTEM

Koppelomäki, Almgatan 23, S-333 00 Smalandsstenar, Sweden

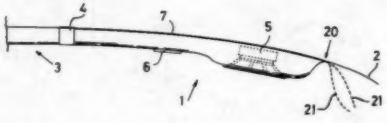
PCT No. PCT/SE85/00143, § 371 Date Dec. 24, 1985, § 102(e) Date Dec. 24, 1985, PCT Pub. No. WO85/05004, PCT Pub. Date Nov. 7, 1985

PCT Filed Mar. 29, 1985, Ser. No. 822,401

Claims priority, application Sweden, Apr. 25, 1984, 84022562

Int. Cl.⁴ H05K *5/00*

U.S. Cl. 181—141 **19 Claims**



1. A speaker system adapted to be mounted to a ceiling of a vehicle, said vehicle having transition regions between the ceiling and side walls of the vehicle, said speaker system comprising: at each end thereof a downwardly extending fastening portion for fastening the speaker system to opposed transition regions of the vehicle; two speaker cabinets, each of said speaker cabinets being connected to one of said fastening portions; at least one speaker element being provided in each of said speaker cabinets; connecting means for connecting said speaker cabinets with each other, said connecting means and said speaker cabinets being telescopingly arranged to adjust the length of said speaker system.

4,673,057

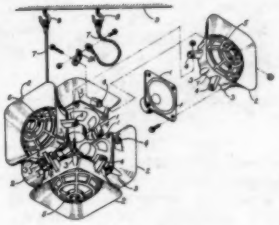
GEOMETRICAL TRANSDUCER ARRANGEMENTS

John M. Glassco, P.O. Box 651, Soap Lake, Wash. 98851

Filed Nov. 13, 1984, Ser. No. 671,099

Int. Cl.⁴ H05K *5/00*

U.S. Cl. 181—144 **17 Claims**



1. An arrangement of electroacoustic transducers comprising in combination, a plurality of similar electroacoustic transducers each having a central axis normal to a substantially planar, peripheral front surface, an annular frame member for each transducer, having a planar rear surface conforming approximately to said peripheral front surface of each said transducer and having an annular opening therein sized and shaped to correspond with the peripheral outline of a respective said transducer, means mounting and securing each said transducer with the peripheral front surfaces thereof abutting said planar rear surface of a respective frame member, attaching means extending outwardly from the sides of each said frame member adjacent the rear surface thereof, for angular attachment of adjacently disposed frame members one to the other to form a polyhedron whereby said frames are situated to define the faces of said polyhedron, said attachment occurring at equispaced locations around the perimeter of each of said frames and coaxial with the central axis, said attachment means disposing the planes of said frames in an equal angular relationship with one another whereby adjacent axes of said frames and corresponding transducers diverge at an approximately equal angle from a central point, said transducers being excited in phase.

4,673,058

HIGH PERFORMANCE AUTOMOTIVE MUFFLER

Peter Roberts, Mississauga, and Sydney Chung, Willowdale, both of Canada, assignors to G Enterprises Limited, Rexdale, Canada

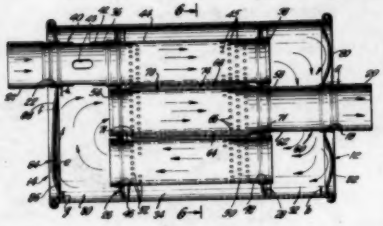
Filed May 9, 1986, Ser. No. 861,525

Int. Cl.⁴ F01N *1/04*

U.S. Cl. 181—266 **11 Claims**

1. A high performance exhaust muffler for a vehicle, said muffler comprising opposed generally eliptical inlet and outlet end caps disposed in spaced parallel relationship, an outer shell extending between and connected to said end caps and defining a generally eliptical cross section and defining orthogonally disposed long and short cross-sectional axes, a pair of spaced apart generally eliptical internal baffles disposed intermediate said end caps and generally parallel thereto, said baffles defining a low frequency tuning chamber therebetween and defining flow chambers intermediate said baffles and said end caps, an inlet tube extending through said inlet end cap and through both said baffles, the portion of said inlet tubes intermediate said baffles being perforated, a perforated transfer tube extending through both said baffles to provide communication between said flow chambers, an outlet tube disposed intermediate said inlet tube and said transfer tube and extending through

both said baffles and through said outlet end cap, the portion of said outlet tube intermediate said baffles being perforated, a generally tubular member of generally eliptical cross section along a major portion of its length surrounding the portion of said outlet tube intermediate said baffles and defining a high



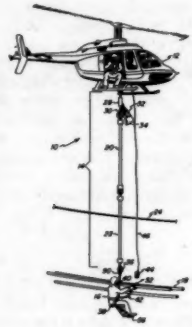
frequency tuning chamber therebetween, said eliptically cross-sectional tubular member including orthogonally disposed long and short cross-sectional axes, the long cross-sectional axis of the eliptically cross-sectioned tubular member being generally orthogonal to the long cross-sectional axis of the eliptically cross-sectioned outer shell.

4,673,059

PLACEMENT OF LOAD ONTO ENERGIZED TRANSMISSION LINE SYSTEM

Michael P. Kurtgis, 2301 Pecan Ct., Pembroke Pines, Fla. 33026

Continuation of Ser. No. 456,720, Dec. 20, 1982, abandoned.
This application Feb. 8, 1985, Ser. No. 699,493
Int. Cl.[4] A62B *1/06*
U.S. Cl. 182—3 **18 Claims**



1. An airmobile transfer system for sequentially transferring a load between an ungrounded overhead platform and elevated components of an energized transmission line system, comprising:

a support means for providing temporary overhead, ungrounded maneuverable lift to support the load during transfer between the transmission line system and said support means;

a placement means connectable to said support means for transferring the load between a component of the energized transmission line and said support means by temporary tethering said support means to said transmission line;

said placement means and said support means capable of maintaining an ungrounded condition while in contact with an energized component of the transmission line system and while being raised to the potential of the energized component;

said placement means includes a suspension means connectable to said support means for suspending the load beneath said support means and adjacent the transmission line system during transfer of the load between said support means and the component of the energized transmission line system;

said suspension means connectable termporarily to both the component and said support means during transfer;

said support means includes a rotary wing aircraft such as a helicopter;

said suspension means includes a transfer means, said transfer means includes a load retaining means connectable to said transfer means at a common point for isolating the load from any force placed on said transfer means while connected to both said support means and the component, said transfer means temporarily connectable to said suspension means and to a component of the transmission line system for rapidly transferring the load between said suspension means to the transmission line component by sequentially connecting the load to both the component and said support means and then disconnecting said load retaining means from the component or the suspension means, said transfer means capable of supporting the load from the transmission line component, said transfer means capable of supporting the load from said suspension means;

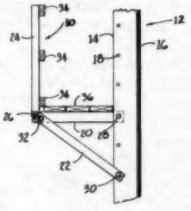
said transfer means includes a break-away means for providing a separation of the connection between said support means and the transmission line component upon generally abrupt exertion of a predetermined dynamic force by said support means while simultaneously tethered to the transmission line component by said transfer means during transfer of a load between said suspension means and the transmission line component, said break-away means connected between said suspension means and the component, placement of said break-away means in said suspension means determines whether the individual remains tethered to said suspension means or the transmission line component upon separation.

4,673,060

FOLDABLE SCAFFOLD AND METHOD

Robert K. Gregory, 1110 Eikel, Suite E, New Braunfels, Tex. 78130

Filed Feb. 18, 1986, Ser. No. 831,367
Int. Cl.[4] E04G *3/14, 5/06*
U.S. Cl. 182—82 **10 Claims**



1. A foldable scaffold comprising:

a scaffold anchor;

a horizontal member pivotally mounted at one end to said scaffold anchor;

a support member pivotally mounted at one end to said horizontal member and releasably mounted to said scaffold anchor at the other end;

means for selectively holding said horizontal member in a first substantially horizontal position and for releasing said horizontal member from said first position to allow said horizontal member and said support member to pivot to a second position in which said horizontal member and said

support member are closely approximated with said scaffold anchor; and

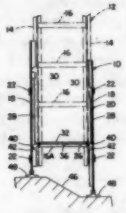
a rail post pivotally mounted at one end to said horizontal member and said support member and supported in a substantially vertical position by said horizontal member holding means.

4,673,061

AUTOMATIC LADDER LEVELING APPARATUS

A. Leon Zeiset, 270 Kriner Rd., Chambersburg, Pa. 17201

Filed Aug. 13, 1986, Ser. No. 896,045
Int. Cl.[4] E06C *7/44*
U.S. Cl. 182—202 **16 Claims**



1. In combination with a ladder having a pair of longitudinally-extending side rails being transversely spaced apart from one another by a series of rungs extending between and interconnecting said side rails and being longitudinally-spaced apart from one another along said side rails, a ladder leveling apparatus comprising:

(a) a pair of extension members each being disposed adjacent to one of said side rails for slidable movement equally freely in either direction therealong and having opposite ends, one of said opposite ends being disposed along said corresponding side rail and the other of said opposite ends being disposable adjacent a surface on which said ladder will be supported;

(b) a relatively stiff, cable-like semi-flexible elongated member having a middle portion which only makes a single pass across said ladder along a lower one of said ladder rungs and below a portion thereof and opposite end portions which extend in opposite directions from said middle portion and are located along said side rails of said ladder above said one lower rung and attached to said respective extension members at locations between said opposite ends thereof; and

(c) means associated with said one lower rung of said ladder and having a portion disposed between said middle portion of said elongated member and said portion of said one lower rung, said means defining at least one surface portion which frictionally engages and crimps said middle portion of said elongated member when the weight of a user is applied to said ladder so as to substantially prevent slippage of said elongated member with respect thereto once said extension members have been placed in contact with the support surface and slidably moved along said side rails of said ladder for positioning and supporting said ladder in a generally leveled upright condition.

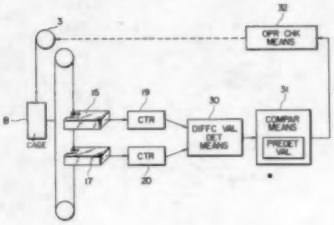
4,673,062

POSITION CONTROL SYSTEM FOR ELEVATOR

Toshiaki Ishii, Ichinomiya, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 9, 1985, Ser. No. 785,717
Claims priority, application Japan, Oct. 15, 1984, 59-215812
Int. Cl.[4] B66B *3/02*
U.S. Cl. 187—134 **3 Claims**

1. A position control system for an elevator comprising a plurality of pulse encoders, each generating spaced signal pulses upon movement of a cage a predetermined distance, a plurality of counters for up and down counting of the signal pulses generated from said pulse encoders depending on running directions of the cage, difference value detection means for determining any difference in counted values registered by said counters, comparison means for comparing the difference



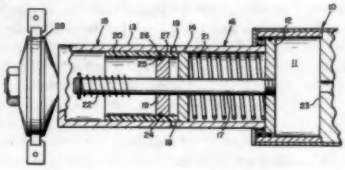
determined by said difference value detection means with a predetermined value for generating an operating signal representing the result of the comparison, and means for operating the cage in response to the operating signal of said comparison means.

4,673,063

HYDRAULIC SHOCK ABSORBER HAVING RESERVE LIQUID SUPPLY CHAMBER AND INDICATOR

Thomas H. Engle, Cape Vincent, N.Y., assignor to General Signal Corporation, Stamford, Conn.

Filed May 12, 1986, Ser. No. 861,948
Int. Cl.[4] F16D *66/00*; G01L *7/16*
U.S. Cl. 188—1.11 **4 Claims**



1. A hydraulic shock absorber having a reserve liquid supply and liquid volume adjustment chamber containing a piston near one end thereof, cylindrical housing means adjoining the liquid supply chamber divided by a fixed abutment into indicating means and liquid supply spring biasing means acting on the piston respectively, the cylindrical housing means having an inspection opening near the abutment for viewing an indicator wherein improved indicating means comprises:

(a) a shaft extending coaxially within the cylindrical housing actuated longitudinally by movement of the piston,

(b) an indicating disc having a pheriphery of a distinctive color journalled on the shaft and adapted for axial movement with the piston to indicate, when viewed through the opening, when the liquid supply chamber is empty,

(c) a substantially transparent sleeve lining a portion of the cylindrical housing means to cover the inspection opening,

(d) disc spring biasing means for biasing the disc axially in the direction of the cylinder inspection opening with increasing force as the reserve liquid supply chamber becomes exhausted, and

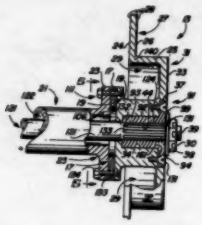
(e) detent means for restraining lateral movement of the disc until force of the disc biasing means has reached a point to insure snap action of the disc from a position outside of viewing area through the opening to an actuated position opposite the opening when substantially no liquid remains in the reserve liquid supply chamber.

4,673,064

REAR DISK BRAKE CONVERSION KIT

Alan L. Will, 4411 W. Calavar, Glendale, Ariz. 85306

Filed Apr. 25, 1986, Ser. No. 855,909
Int. Cl.[4] B60T 1/06
U.S. Cl. 188—18 A 4 Claims



1. A kit for converting the rear drum brakes of a motor vehicle originally equipped with only front disk brakes and rear drum brakes, to rear disk brakes, comprising:

a rotor including an annular disk having a first diameter, an outwardly extending cylindrical hub having a second diameter, said hub being substantially hollow and having an inwardly facing open end disposed axially on and integral with the interior edge of said annular disk, said hub further having an outwardly disposed face having an aperture means disposed axially therethrough, the inwardly facing open end of said hub being coextensive with the circular aperture in the center of said annular disk for forming a generally cylindrical annular hollow space about the inner periphery of said hub, said hub having a generally cylindrical core integral with the inwardly facing surface of said hub and generally perpendicular to the plane thereof, and said bore passing through said hollow space for forming the inner annular boundary thereof, the innermost end of said cylindrical core including a first mounting means with a plurality of mounting apertures therein, said cylindrical core having a central axial bore formed therethrough from said face substantially through said cylindrical core of said first mounting means, said core having a third diameter, and means for forming a circular recess having a fourth diameter, said fourth diameter being greater than said third diameter, within the face of said hub coaxial with said bore;

a conventional disk brake caliper means having a slot adapted to be operatively received about the peripheral end portion of said annular disk for braking purposes and caliper mounting means for positioning said caliper in its operable position;

a mounting plate having one end portion including the plurality of aperture means corresponding to the aperture means of said first mounting means and an opposite end portion having second aperture means thereon, said second aperture means corresponding to the aperture means of said caliper mounting means, and further including fastening means adapted for engaging the aperture means of said opposite end of said mounting plate and of said caliper means for fixedly securing said caliper means in place for proper disk brake action;

a hub insert means having a generally cylindrical hub portion, said hub portion having a diameter substantially equal to but slightly greater than said diameter, said hub insert means further including an integral circular flange at one end thereof, said flange having a diameter substantially equal to but slightly greater than the diameter than said fourth diameter, said flange having an aperture means operatively disposed axially therethrough, said flange and said cylindrical hub portion having a circularly splined channel formed therethrough and coaxial with the axis thereof, said cylindrical hub portion being force-fitted into said central axial bore of said hub core until said flange is force-fitted into said recess and the outer face of said flange is coplanar with the face of said hub, and further including fastening means for operatively coupling the hub insert to said rotor;

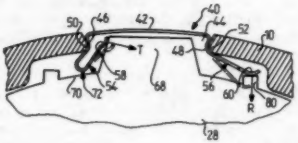
fixed axle casing means including mounting means on the outermost end thereof said axle-mounting means including a plurality of apertures therethrough corresponding to said apertures of said one end of said mounting plate and of the mounting means of the core adapted to be aligned therewith, and further including fastener means for operatively engaging said aperture means and securing said mounting means of said fixed axle to one end of said bracket plate, and the mounting means of said hub fixedly securing the normally-splined outer end portion of the drive axle within said fixed axle being operatively disposed in operable engagement within the central splined bore of said core with a threaded end portion of said drive axle forward of said splined end on said drive axle extending through the aperture of said flange, said flange further including gland nut means for threadedly securing the threaded end of said drive axle to the outer face of said flange.

4,673,065

SPRING FOR A DISC BRAKE, AND DISC BRAKE EQUIPPED WITH SUCH A SPRING

Jean-Louis Gerard, Paris, and Claude Le Marchand, Domont, both of France, assignors to Bendix France, Paris, France

Filed May 8, 1986, Ser. No. 860,947
Claims priority, application France, May 22, 1985, 85 07708
Int. Cl.[4] F16D 65/02
U.S. Cl. 188—73.38 10 Claims



1. Spring (40) for a disc brake of the type comprising a caliper (10) which is slideably mounted parallel to an axis of a rotating disc (30) on a fixed support (12) by means of at least two axially sliding surfaces (16, 18) which are formed on the caliper (10) and on the fixed support (12) and are elastically held in contact, and two friction components (22, 24) which are housed so as to be anchored and to slide axially in an opening (34) in the fixed support, in order to come into frictional engagement with opposing surfaces of the disc during operation of a brake actuator (32), the spring being mounted elastically in an opening (44) formed in the arch of the caliper and exerting a radial force (R) upon the the support plates (26, 28) of the friction components (22, 24), which is essentially directed along a radius of the disc (30) in a direction of an axis of the latter and a tangential force (T) which is perpendicular to the radial force (R) so as to push each of the friction components (22, 24) tangentially to the circumference of the disc to ensure that the latter are held in a preferential lateral position, characterized in that the spring comprises a folded metal leaf including a mounting portion (42) which is joined elastically by its sides which are circumferentially spaced apart (46, 48) to two rigid actuating portions (58, 60), a first rigid portion (58) lying parallel to the axis of the disc (30) and being capable of pushing elastically by two free ends (62, 64) the support plates (26, 28) in a direction which is essentially circumferential (T), a second (60) of the rigid portions (58, 60) also lying parallel to the axis of the disc (30) and being capable of pushing elastically

by its two free ends (74, 76) the support plates (26, 28) essentially radially (R) towards the axis of the disc.

4,673,066

BRAKE IN A LIGHT-CONSTRUCTED TRANSPORT CARRIAGE

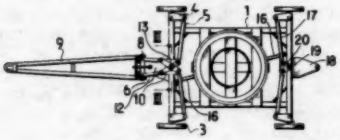
Juhani Könönen, Hyvinkää , Finland, assignor to Elevator GmbH, Baar, Switzerland

Filed Feb. 20, 1986, Ser. No. 831,276

Claims priority, application Finland, Feb. 20, 1986, 850689

Int. Cl.[4] F16D 65/14

U.S. Cl. 188—119 **6 Claims**



1. A carriage comprising

a frame part (1) with a vertical pivot,

a tongue (12) pivoting about said vertical pivot (14), said tongue (12) having a horizontal pivot (8),

a draw means (9) connected to said tongue (12) by said horizontal pivot (8) so that it can be lifted up,

wheels including a pair of turnable wheels (3) each of which has a wheel-turning arm (4) for being turned with respect to said frame part, and

moving means connected between said draw means (9) and the wheel-turning arm (4) of at least one of said turnable wheels (3), said moving means comprising

at least one moving rod (6) connected at a first end eccentrically to said draw means (9) with respect to said horizontal pivot (8),

at least one linkage rod (5) connected pivotably at one end to one of said wheel turning arms (4), and

shear means arranged to pivot on said frame part (1) and to have ends connected to a second end of said at least one moving rod (6) and to another end of said at least one linkage rod (5), wherein, upon lifting the draw means (9) to a vertical position, said pair of turnable wheels (3) are turned to be substantially non-parallel and to provide a substantial braking effect for the carriage.

4,673,067

ADJUSTABLE SHOCK ABSORBER, ESPECIALLY FOR MOTOR VEHICLES

Hans Münning; Jürgen Bock; Bernd Oldach; Josef Ladic, all of Cologne; Max-Otto Rauert, Ennepetal; Hugo Emde, Hagen; Dietrich Petzsch, and Johannes J. de Baan, both of Ennepetal, all of Fed. Rep. of Germany, assignors to August Bilstein GmbH & Co. KG, Ennepetal, Fed. Rep. of Germany

Division of Ser. No. 648,291, Sep. 6, 1984. This application Apr. 2, 1986, Ser. No. 847,195

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1983, 3334704; Aug. 1, 1984, 3428306

Int. Cl.[4] F16F 9/46

U.S. Cl. 188—299 **7 Claims**

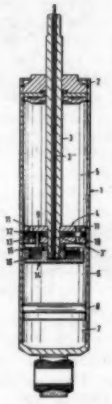
1. An adjustable shock absorber, especially for a motor vehicle, which comprises:

a cylinder containing a damping fluid;

a piston in said cylinder subdividing same into two working compartments;

a piston rod connected to said piston and extending axially from one end of said cylinder said piston rod being sealed relative to said cylinder, said piston and said rod being axially movable in said cylinder, said piston being provided with damping-force generating fluid flow passages interconnecting said compartments;

a throttle member on said piston for controlling the effective cross section of said passages, said throttle member being biased into an intermediate rest position normally obstructing flow through said passages in the absence of a pressure differential between said compartments induced by movement of said piston in said cylinder and being formed with fluid pressure reaction surfaces responsive to a pressure differental between said compartments upon displacement of said piston in said cylinder to shift said member selectively in one of two opposite throttle-member directions depending upon the sense of the pressure



differential between said compartments and the direction of movement of said piston by the fluid force on said reaction surfaces to selectively unblock flow through said passages and thereby vary said effective cross section; and

electromagnetic drive means including a magnetic circuit affecting said member and a coil on said piston for generating magnetic force in said magnetic circuit for applying a restoring force to said member which is zero in said rest position of said member and which increases progressively as said member is shifted from said rest position by the fluid force on said reaction surface and which is effective selectively in opposite directions depending upon the direction of displacement of said throttle member from said rest position.

4,673,068

HYDRAULIC TWIN-PIPE SHOCK ABSORBER

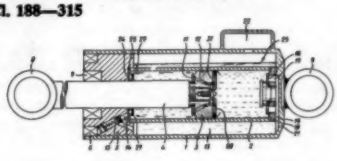
Alexis M. R. De Bruijn, Oud-Beijerland, Netherlands, assignor to Koni B. V., Oud-Beijerland, Netherlands

Filed Jan. 16, 1986, Ser. No. 819,895

Claims priority, application Netherlands, Jan. 21, 1985, 8500145

Int. Cl.[4] F16F 9/40

U.S. Cl. 188—315 **1 Claim**



1. A hydraulic twin-pipe shock absorber for horizontal use, which is particularly suitable for rail vehicles, said shock ab-

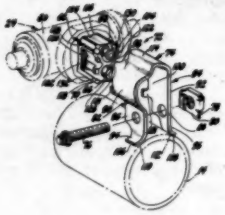
sorber being provided with a cylindrical housing, a fluid-filled working cylinder provided inside said housing, a radial clearance between said housing and said working cylinder, a piston which is displaceable in said working cylinder and has a first connection which is located between piston clearances on either side of the piston and can be shut-off by a first non-return valve, a piston rod projecting through a cover of the working cylinder, a second connection which extends through said cover between the working cylinder and said radial clearance and can be shut-off by a first shut-off valve, and a third connection which is located between said radial clearance and the working cylinder clearance not containing the piston rod and can be shut-off by a second shut-off valve, wherein said first non-return valve admits hydraulic fluid to a working cylinder part with the piston rod, said first shut-off valve admits hydraulic fluid to the radial clearance, and said second shut-off valve admits hydraulic fluid to said working cylinder clearance without the piston rod, wherein a disc (28) is fixed against the piston (3) with a number of uniformly distributed protuberances (29) extending radially and with a surface of the piston bounding narrow radial channels defining circumferential ends which debouch in said working cylinder clearance and wherein the inside ends of said narrow channels are connected to channels (12) in the piston, wherein an annular foam venting channel (24) is positioned between said cover (5) and the clearance around the piston rod (4) into which debouches a pipe (14) with said first shut-off valve (13), while disposed in a boundary wall of said annular foam venting channel, facing said working cylinder clearance, a number of regularly distributed narrow pressure reducing bores (27) are provided.

4,673,069

WHEEL CYLINDER MOUNTING ARRANGEMENT

Vincent M. Staub, Jr., Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 18, 1986, Ser. No. 842,659
Int. Cl.[4] F16D *65/02*
U.S. Cl. 188—331 **11 Claims**



1. For use in a wheel brake assembly having an axle housing with a mounting flange secured thereto, a non-braking torque-taking backing plate secured to one side of the mounting flange and supporting brake shoes for guided braking movement, an anchor pin secured to the mounting flange through the backing plate and providing means receiving braking torque from the brake shoes and transmitting that torque through the mounting flange to the axle housing, a wheel cylinder having a main body and a mounting boss extending transversely from the main body, that boss extending through a snugly fitting wheel cylinder-locating opening in the backing plate and an opening in the mounting flange which is larger in diameter than the mounting boss so as to provide lateral clearance around the mounting boss therein relative to the mounting flange, the improvement including:

a wheel cylinder locating and securing arrangement which when installed grips side portions of the wheel cylinder mounting boss and the axle housing on the opposite side of the backing plate from the brake shoes to locate and secure the wheel cylinder to the axle housing independently of the locating opening in the backing plate, said arrangement comprising:

bracket means having a first leg and a second leg, said legs respectively having first and second upper portions and first and second lower portions and first and second intermediate portions;

said first and second upper portions having extensions adapted to extend into the opening in the mounting flange receiving the wheel cylinder mounting boss so as to be positioned on opposite sides of the wheel cylinder mounting boss including at least portions of those opposite sides extending through the mounting flange opening, and being arranged to grip side sections of the wheel cylinder mounting boss;

said first and second lower portions having ends adapted to engage the axle housing in gripping relation at least at transversely spaced points thereon;

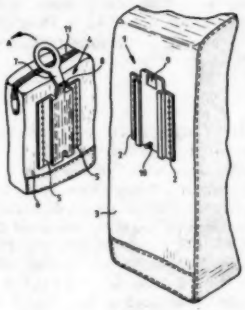
said first and second intermediate portions having adjustable tightening and loosening means extending therebetween, said adjustable tightening and loosening means when tightened during installation of said arrangement moving said first and second legs closer together to cause said first and second upper portions to tightly grip the wheel cylinder mounting boss in non-slipping clamping relation and said first and second lower portions to tightly grip the axle housing in non-slipping clamping relation, thereby locating and securing said wheel cylinder to said axle housing, said adjustable tightening and loosening means being capable of being loosened to loosen the clamping grip of said legs on the wheel cylinder mounting boss and the axle housing, permitting removal of the wheel cylinder from the backing plate for service.

4,673,070

RELEASABLE ASSEMBLY FOR CONNECTING BAG MEMBERS

Gilbert Ambal, Frepillon, France, assignor to I.T.W. de France, Beauchamp, France

Filed Feb. 12, 1986, Ser. No. 828,867
Claims priority, application France, Feb. 26, 1985, 85 02732
Int. Cl.[4] A45C *3/00, 5/06, 13/00*
U.S. Cl. 190—108 **1 Claim**



1. A releasable assembly for connecting a pair of bag members in a side by side abutting manner comprising:

a substantially flat female receiving member having top and bottom sides wherein said bottom side is affixed to one of said pair of bag members and said top side has an open faced rectangular groove defined by two oppositely facing spaced apart channel members, said groove being opened at both ends;

a flat rectangular male insertion member having top and bottom sides wherein said bottom side is affixed to the other of said pair of bag members and said top side has an

outwardly projecting tongue member for sliding engagement within said groove of said female receiving member;

a catch member integral with a first end of said female member;

a pawl member integrally hingedly connected to a first end of said male insertion member for engagement with said catch member of said female member, said pawl member having an integrally connected release lever;

a peg member integral with a second end of said female member opposite said first end of said female member within said groove of said female member; and

a notch formed in a second end of said male member opposite said first end of said male member for abutment with said peg member whereby said second end of said male member is inserted into said first end of said female member and is advanced within said groove of said female member till said notch member abutts with said peg member to prevent further insertion of said male member within said female member and said pawl member ratchets within said catch member to prevent withdrawal of said male member and said release lever is accessible from the exterior of said pair of bag members to enable disengagement therein.

4,673,071

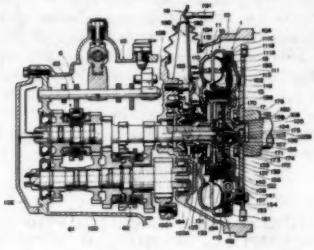
POWER DELIVERY SYSTEM

Shuzo Moroto; Takao Taniguchi, and Shiro Sakakibara, all of Anjo, Japan, assignors to Aisin-Warner Limited, Anjo, Japan

Filed Nov. 28, 1984, Ser. No. 675,876

Int. Cl.[4] F16D *33/08*; F16H *45/02*

U.S. Cl. 192—3.21 **2 Claims**



1. A power delivery system for connecting a transmission to an output shaft of an engine, said transmission including a dog clutch for establishing a power transmission route by the engagement of the dog clutch, said power delivery system comprising:

an input shaft for transmission the driving force of an engine;

an output shaft

a fluid coupling for transmitting the driving force from said input shaft to said output shaft, said fluid coupling comprising a fluid coupling casing, said casing being mounted on and rotatably driven by said input shaft, said fluid coupling including a plurality of pump blades secured within said case to the radially outward periphery of said case, said fluid coupling also including turbine blades positioned within said case, at the radially outward periphery of said case, and a turbine shell which retains the turbine blades in position;

a clutch for disconnecting the engagement between an output member of said fluid coupling and said output shaft when the dog clutch is operated in order to switch between an on-state and an off-state, said clutch including a clutch plate case in the form of a hollow cylinder which is connected to said turbine shell, a clutch disk wheel connected to said output shaft, a first set of clutch plates supported by said clutch plate case, and a second set of clutch plates supported by said clutch disk wheel, said first and second sets of clutch plates being positioned within said case adjacent the radially inward periphery of said fluid coupling, said clutch being engaged when said first and second sets of clutch plates are selectively pressed;

an oil pump for supplying oil into said fluid coupling case, said oil pump being positioned within said case adjacent the radially inward periphery of said clutch.

4,673,072

4-WHEEL DRIVE TRANSMISSION CONTROL SYSTEM

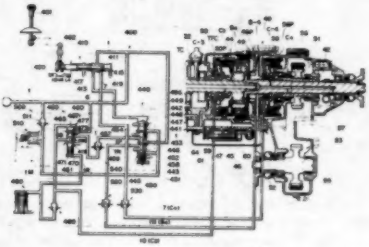
Chihiro Hosono; Yoichi Hayakawa, both of Anjo; Seitoku Kubo, Toyota; Yutaka Taga, Toyota, and Shinya Nakamura, Toyota, all of Japan, assignors to Aisin-Warner Limited and Toyota Motor Corporation, both of, Japan

Filed Nov. 14, 1984, Ser. No. 671,467

Claims priority, application Japan, Nov. 14, 1983, 58-214646; Dec. 29, 1983, 58-248077

Int. Cl.[4] B60K *23/08*

U.S. Cl. 192—3.57 **2 Claims**



1. A control system for a 4-wheel drive transmission including a transfer unit capable of establishing 2-wheel drive mode and 4-wheel drive mode by operation of first hydraulic means and capable of establishing low-speed and high-speed gear positions in said 4-wheel drive mode by operation of second and third hydraulic means, said control system comprising:

a source of oil at line pressure;

a manual valve having:

an inlet port connected to said line pressure source,

a first outlet port,

a second outlet port for supplying said line pressure directly to said first hydraulic means,

a first drain port,

a second drain port, and

a spool mechanically connected to a shift lever and shiftable between first, second and third positions;

said inlet port being in fluid communication with said first outlet port and said second outlet port being in fluid communication with said second drain port when said spool is in said first position,

said inlet port being in fluid communication with said first and second outlet ports when said spool is in said second position,

said inlet port being in fluid communication with said second outlet port and said first outlet port being in fluid communication with said first drain port when said spool is in said third position;

an automatic transfer control mechanism for supplying oil at a control pressure which varies according to vehicle speed;

an inhibitor valve having:

a first chamber connected to said first outlet port,

a second chamber connected to receive control pressure from said automatic transfer control mechanism, and

a spool shiftable between a high-speed position and a low-speed position to selectively connect said oil pressure source and said second or third hydraulic means,

said spool being held in said high-speed position when said line pressure is supplied to said first chamber through said manual valve or when said control pressure supplied to said second chamber is above a predetermined level, and said spool being held in the low-speed position when said line pressure is drained from said first chamber and the oil pressure supplied to said second chamber is below a predetermined level.

4,673,073

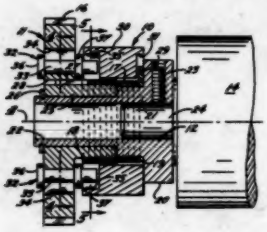
CENTRIFUGAL SPRING CLUTCH

John H. Weatherby, Pitman, N.J., assignor to Warner Electric Brake & Clutch Company, South Beloit, Ill.

Continuation-in-part of Ser. No. 628,205, Jul. 5, 1984, abandoned. This application Aug. 5, 1985, Ser. No. 762,690

Int. Cl.[4] F16D *13/08, 43/18*

U.S. Cl. 192—35 **10 Claims**



1. A clutch having, in combination, input and output hubs rotatable about a common axis, a sleeve telescoped with and spaced radially from said hubs, a helical spring normally wound around the hubs in torque-transmitting engagement with said hubs whereby the input hub drives the output hub, one end of said spring being secured to said sleeve and the other end of said spring being secured to one of said hubs, and a connection between said one hub and said sleeve, said connection including a first slot in said one hub and extending outwardly away from said axis, a second slot in said sleeve and extending outwardly away from said axis, and a pin paralleling said axis and projecting through both of said slots, said pin having substantial mass to move radially outwardly in said slots by centrifugal action when said one hub rotates at a predetermined speed, one of the slots extending spirally relative to the other to turn said sleeve relative to said one hub in a direction to wind said spring away from said hubs and out of torque-transmitting engagement therewith when said pin moves outwardly in said slots.

4,673,074

MULTI-COIN OPERATED DISPENSING MECHANISM

Gary D. McCormick, Skokie, Ill., assignor to National Sanitary Laboratories, Inc., Lincolnwood, Ill.

Filed Oct. 25, 1984, Ser. No. 664,756

Int. Cl.[4] G07F *5/06*

U.S. Cl. 194—236 **4 Claims**

1. Coin-operated dispensing mechanism comprising:

a disc-like coin-receiving wheel having at least a first perimetrical coin-receiving receptacle having a thickness substantially equal to a plural multiple of the thickness of a coin of predetermined denomination;

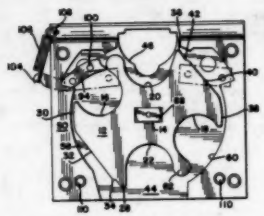
said first receptacle dimensioned for receiving a number of coins of said predetermined denomination in face-to-face relationship, said number equal to said plural multiple;

a second perimetrical coin-receiving receptacle the same as and diametrically spaced from said first receptacle;

a third perimetrical coin-receiving receptacle in close circumferential proximity to said first receptacle and dimensioned to receive a coin of preselected denomination;

a fourth perimetrical coin-receiving receptacle in close circumferential proximity to said second coin-receiving receptacle and diametrically spaced and the same as the third-coin-receiving receptacle;

said wheel having a first lobed portion circumferentially between said first and third coin-receiving receptacles, a second lobed portion circumferentially between said second and fourth coin-receiving receptacles, a third lobed portion adjacent to said fourth coin-receiving receptacle, a first convex arcuate porrtion adjacent to said first coin-receiving receptacle, a first substantially planar portion between said first arcuate portion and said third lobed portion, a first shallow concave portion between said first planar portion and said third lobed portion, a fourth lobed



portion adjacent to said third coin-receiving receptacle, a second convex arcuate portion adjacent to said second coin-receiving receptacle, a second substantially planar portion between said second arcuate portion and said fourth lobed portion and a second shallow concave portion between said second planar portion and said fourth lobed portion, said first and second lobed portions being alike and diametrically opposite, said third and fourth lobed portions being alike and diametrically opposite, said first and second arcuate portions being alike and diametrically opposite, said first and second planar portions being alike and diametrically opposite and substantially parallel and said first and second concave portions being alike and diametrically opposite.

4,673,075

WORKING ARRANGEMENTS FOR PERFORMING MULTIPLE OPERATIONS WITH ROBOTS

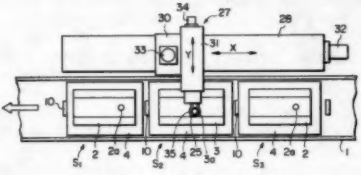
Masato Ueyama, Higashihiroshima; Takeshi Kanamaru; Toshikazu Shirai, both of Hiroshima, and Kiyoshi Nakano, Higashihiroshima, all of Japan, assignors to Mazda Motor Corporation, Japan

Filed Nov. 19, 1985, Ser. No. 799,596

Claims priority, application Japan, Nov. 22, 1984, 59-247829

Int. Cl.[4] B23Q *15/22, 16/00*

U.S. Cl. 198—339.1 **11 Claims**



1. A working arrangement for performing multiple operations with a robot comprising:

a plurality of working stations at each of which a predetermined operation with a tool is performed on an unfinished work,

shifting means provided in connection with each of said

working stations for holding the tool so as to be movable between a predetermined reference position and an operating position in each working station, for causing the tool to act on the work at said operating position after the tool has been shifted thereinto, and for shifting the tool to said predetermined reference position from said operating position, and

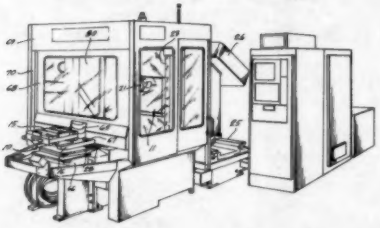
a single robot provided to be movable in relation to said plurality of working stations for causing the tool to move from said predetermined reference position to said operating position in each of said plurality of working stations.

4,673,076

ROTARY SHUTTLE FOR MACHINE TOOLS

Clyde E. Mattson, Waukesha, Wis., assignor to Kearney & Trecker Corporation, West Allis, Wis.

Filed Sep. 4, 1984, Ser. No. 647,116
Int. Cl.[4] B65G 47/00
U.S. Cl. 198—346.2 **2 Claims**



1. A machine tool having a movable work supporting table and a shuttle mechanism for exchanging workpieces with the work supporting table comprising; an enclosure enclosing the work area of the machine tool including the work supporting table; a frame; an arm rotably mounted on said frame, a pair of work supports at opposite ends of said arm in position so that when one of said supports is in a loading station outside of said enclosure the other work support is an exchange station within said enclosure for loading a new workpiece into the work supporting table or removing a finished workpiece from the work supporting table; a panel extending upwardly from said arm to form one side of said enclosure; the center of said panel being coincident with the axis of rotation of said arm, and means connected for rotating said arm in increments of 180° for exchanging workpieces between the loading station and the exchange station and said panel will rotate with said arm to again close the opening in said enclosure upon the completion of a rotary movement; means connected for moving said work table into said exchange station to position the finished workpiece thereon for engagement by one of the work supports on said arm; and means connected for raising said arm to engage the finished workpiece and lift it off of said work table and for lowering said arm to place a new workpiece moved into the exchange station on the work supporting table.

4,673,077

ARTICLE SUPPLY APPARATUS

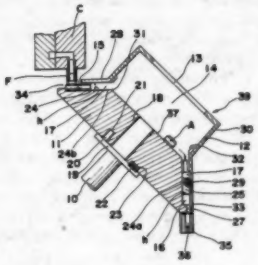
Shin ichi Taniguchi, Osaka, Japan, assignor to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Feb. 3, 1986, Ser. No. 825,267
Claims priority, application Japan, Feb. 14, 1985, 60-28087
Int. Cl.[4] B65G 47/24
U.S. Cl. 198—393 **8 Claims**

1. An article supply apparatus for pharmaceutical products each having predetermined dimensions of length, width and thickness, said apparatus comprising:

a rotary drum having at least a portion of the outer peripheral surface thereof frusto-conical in shape, said drum being rotatable around the conical axis and having the conical axis inclined at a predetermined angle with the end toward the smaller diameter of the frusto-conical surface portion extending upwardly, with the upper profile of the frusto-conical surface portion as viewed in elevation, lying substantially in a horizontal direction and the lower profile of the frusto-conical surface portion lying substantially in a vertical direction, a lower region of the frusto-conical surface portion which is toward the lower end of the conical axis having thereon a plurality of radial projections of predetermined dimension in the radial direction and spaced around the circumference thereof at a predetermined pitch from each other for defining product receiving pockets therebetween each having a width slightly greater than the width of the product, a further region of the frusto-conical surface portion extending from said projections to the upper end of said frusto-conical surface portion a distance greater than the length of the product and being smooth and constituting a slide surface for the product;

a hopper mounted on said drum for rotation with said drum, said hopper defining a product receiving space at the end of said drum toward the upper end of said conical axis and



having a lower portion extending toward the lower end of said conical axis and extending parallel to and spaced from the further region of said frusto-conical shaped surface portion a distance slightly greater than the thickness of the product and covering a portion of said pockets for leaving a part of each pocket uncovered which is at least the size of one product, the space defined between said lower portion of said hopper and said slide surface opening into said product receiving space;

product take-out means positioned at a take-out position along the periphery of said rotary drum opposed to the exposed part of said pockets for removing products from successive pockets as the pockets move past said take-out position during rotation of said rotary drum; and

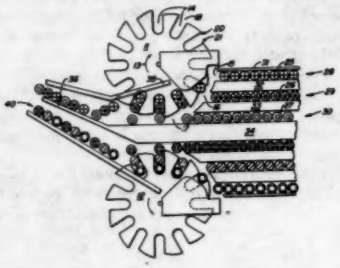
means connected to said drum for rotating said drum around said conical axis;

whereby products are caused to move from the product received space across said slide surface during rotation of said drum for orienting the products with respect to the thickness direction and are caused to move into said pockets for being oriented in the widthwise direction, and the products can be taken out from the pockets at the take-out position in a predetermined posture.

4,673,078
APPARATUS AND METHOD FOR ASSEMBLING PRODUCT COMBINATIONS

George J. Swiatlowski, Fremont; Donald P. Trapp; Duane B. Liescheidt, both of White Cloud; Arden G. McDaniel, and Maurice W. Brandt, both of Fremont, all of Mich., assignors to Gerber Products Company, Fremont, Mich.

Filed Jun. 30, 1986, Ser. No. 880,416
Int. Cl.[4] B65G 47/68
U.S. Cl. 198—450 17 Claims



1. Apparatus for assembling articles from a plurality of sources into combinations containing one article from each source, said apparatus comprising:

a rotor having a plurality of pockets along its periphery opening outward;

means for conveying articles from said sources into said pockets at fixed entry points spaced apart along said periphery, one said fixed entry point for each said source;

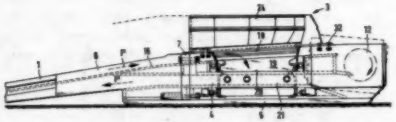
a stationary barrier limiting the penetration of said articles into said pockets to a depth increasing in the direction of rotation of said rotor to permit addition to each said pocket of one article at each said fixed entry point; and

means for retrieving said combinations from said pockets at a fixed location past the last of said fixed entry points.

4,673,079
TRANSFER STATION

Dieter Gründken, Lünen, and Reinhold Brüggemann, Dortmund, both of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhütte Westfalia GmbH, Lünen, Fed. Rep. of Germany

Filed Feb. 28, 1985, Ser. No. 706,595
Claims priority, application Fed. Rep. of Germany, Mar. 7, 1984, 3408282
Int. Cl.[4] B65G 47/76
U.S. Cl. 198—599 16 Claims



1. A transfer station assembly for transferring mineral material from a longwall scraper-chain conveyor to a roadway scraper-chain conveyor, each of the scraper-chain conveyors including an endless scraper assembly having a plurality of scrapers attached to endless chain means, said assembly comprising:

(a) a box frame including means for guiding an upper run of the roadway conveyor between upper and lower runs of the longwall conveyor,

(b) deflector means arranged on the box frame for laterally discharging mineral material from the upper run of the longwall conveyor on to the upper run of the roadway conveyor,

(c) first guide bar means for guiding the scrapers of the scraper assembly of the roadway conveyor within the box frame,

(d) said first guide bar means being detachably secured to the box frame to be readily releasable and replaceable whereby roadway conveyors of different types and/or widths can be connected to the box frame, and

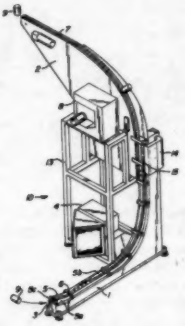
(e) second guide bar means for guiding the scrapers of the scraper assembly of the longwall conveyor,

(f) said second guide bar means being detachably secured to a lower face of the deflector means to be readily releasable and replaceable.

4,673,080
ARTICLE TRANSPORT ELEVATOR

James G. Bartylla, Morgan Hill, Calif., assignor to Raymond Production Systems Corporation, Hollister, Calif.

Filed Jun. 12, 1986, Ser. No. 873,496
Int. Cl.[4] B65G 17/46
U.S. Cl. 198—689.1 11 Claims



1. A device for transporting a plurality of similarly oriented articles closed on at least one end between differing levels, the device comprising:

A. a first plenum having a perforated upper surface, said perforations being oriented to direct air from inside the plenum in the direction of transport of said plurality of similarly oriented articles;

B. means for providing air pressure to said first plenum in an amount sufficient to at least transport said plurality of similarly oriented articles from a first entry level to a transfer level;

C. a second plenum having an air permeable upper surface being vertically oriented with respect to said first plenum and overlapping said first plenum at the transfer level;

D. belt means adapted to be supported by and moved over the upper surface of said second plenum, said belt means being perforated to enable low pressure established in the second plenum to draw air through said belt means in an amount sufficient to secure said similarly oriented articles thereto;

E. means for creating low pressure within the interior of said second plenum;

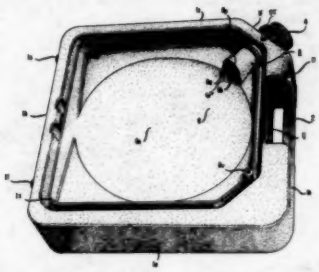
F. means for moving said belt means to transport said similarly oriented articles from said transfer level to a discharge level;

G. transfer means located at the overlap of said first and second plenums which possesses a nozzle for directing air against said similarly oriented articles at least when said articles first contact said belt means in an amount to enhance the securing of said articles to said belt.

4,673,081
WASTE OIL DRAIN COLLECTOR AND STORAGE CONTAINER KIT

Peter C. Habig, 79 Division Ave., Summit, N.J. 07901, and Ronald R. Daugherty, Washington, N.J., assignors to Peter C. Habig, Summit, N.J.

Continuation of Ser. No. 801,221, Nov. 25, 1985, abandoned.
This application Jun. 27, 1986, Ser. No. 879,849
Int. Cl.[4] B65D *25/42;* B65B *3/04*
U.S. Cl. 206—223 7 Claims



1. A kit for collecting and storing oil and other liquids which comprisese in combination:

a receptacle having a substantially flat collection support base extended in one plane, said receptacle having enclosing sidewalls including a narrower substantially flat resting base extended in a plane substantially normal to said collection support base;

a drain pan supported by said enclosing sidewalls and seated in said receptacle in a plane spaced-apart from said collection support base, said collecting pan forming with said sidewalls and said substantially flat collection support base an internal storage chamber, the external surface of said collecting pan being shaped to include an inwardly-directed concavity which slopes downward toward an area of greatest concavity adjacent one sidewall when said receptacle is resting on said substantially flat collection support base;

said receptacle including three-way rotary valve means communicating between said drain pan, said storage container, and an external spout portion for remotely controlling the flow of oil between said drain pan, said storage container, and said external spout portion;

in a first carrying position: said valve means simultaneously closed between said drain pan and said storage container, and between said storage container and said external spout portion;

in a second liquid collecting postion: said valve means open between said drain pan and said storage container, and closed between said storage container and said external spout portion, and

in a third pour-out position: said valve means closed between said drain pan and said storage container, and open between said storage container and said external spout portion.

4,673,082
GOLF BAG WITH ROTARY CLUB CARRIER

Richard O. Hemme, 3609 Stoughton Rd., Erie, Pa. 16506

Filed Jun. 5, 1986, Ser. No. 870,869
Int. Cl.[4] A63B *55/00*
U.S. Cl. 206—315.6 7 Claims

1. In combination a golf bag and a golf club carrier comprising,

said bag having a bottom, side wall and a top,

said bag top having a circular opening,

said carrier having a circular bottom end, a circular top and means attaching said carrier top to said bottom end holding said carrier top and said carrier bottom end in spaced relation to each other,

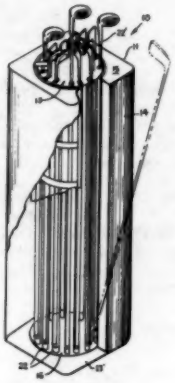
said club carrier being disposed in said bag with said carrier top rotatably received in said circular opening in said bag top,

said carrier bottom end resting on said bag bottom,

said carrier bottom end having a plurality of circumferentially spaced upwardly facing cups having side walls defining a hollow enclosure attached thereto,

said carrier top having a plurality of circumferentially spaced outwardly opening notches therein,

said notches being axially aligned with said cups on said carrier bottom end,



said bag having an axially extending slot therein,

said slot extending from said bag bottom to said bag top and communicating with said circular opening in said bag top,

golf clubs having a first end of their shafts received in said cups and an intermediate part of said shaft being received in said notches,

said clubs having a second end extending above said bag top whereby said clubs can be removed from said bag through said slot,

means for rotating said carrier in said bag to selectively bring each said club into alignment with said slot in said bag.

4,673,083
STORAGE CONTAINER FOR A TAPE CASSETTE

Walter Schuett, Kehl, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 2, 1985, Ser. No. 782,928
Claims priority, application Fed. Rep. of Germany, Oct. 3, 1984, 8429000
Int. Cl.[4] B65D *85/672*
U.S. Cl. 206—387 1 Claim

1. A storage container for a tape cassette, comprising:

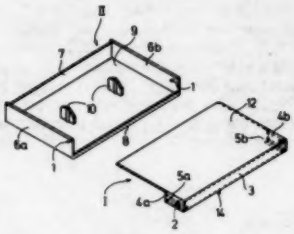
a base part having side walls, a front wall and a back wall,

a lid part having a lid wall, side walls and a back wall defining in part cassette retaining means for holding the cassette, and

cooperating hinge means on the side walls of the base part and of the lid part, respectively, for pivotally connecting said lid part to said base part, said hinge means being located on said side walls at a predetermined distance from said base wall,

the back wall of said base part having a height substantially smaller than the height of the other walls of said base part, and said back wall of the lid part having a height complementing the height of the back wall of the base part in the closed position of the container, and said back walls together being as high as the side walls of the base part,

said predetermined distance of the hinge means from said base wall being chosen so that in the opened position of the container the back walls of the base part and the lid part come in contact with one another at an opening angle



which is defined by said predetermined distance and which is in the range of 90° to 180° , and

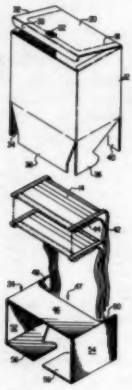
the back walls of the base part and the lid part being formed with at least two locking cams which come into contact with one another only when the container is closed.

4,673,084

CONTAINER FOR DISPENSING SURGICAL MASKS

Vance M. Hubbard, and Welton K. Brunson, both of Bedford, Tex., assignors to Tecnol, Inc., Fort Worth, Tex.

Filed Sep. 23, 1985, Ser. No. 778,881
Int. Cl.⁴ B65D *85/24*
U.S. Cl. 206—438 **8 Claims**



1. A dispenser for shipping and dispensing surgical masks of the type having a face panel and attached ties, comprising:

a container for holding a plurality of the surgical masks oriented in a stacked configuration, said container having a dispensing aperture for enabling removal of the masks from said container;

dividing means for separating said container into first and second compartments, said first compartment being disposed adjacent said dispensing aperture and containing the stacked face panels of the masks;

said dividing means including means for allowing the mask ties to be disposed along one side of said container from said first compartment into said second compartment;

said second compartment being disposed adjacent said first compartment and opposite said dispensing aperture, and said second compartment being dimensioned to contain the ends of the mask ties;

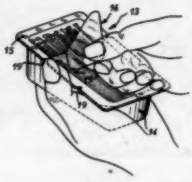
said masks thereby being individually removable from said container through said dispensing aperture without the undesirable removal or entanglement of adjacent masks.

4,673,085

PACKAGE WITH PEEL-OFF FILM CLOSURE

Michel Badouard, Barentin; Claude Durame, Montville, and Bernard Pade, Totes, all of France, assignors to Legrand, Limoges, France

Filed Dec. 26, 1985, Ser. No. 813,671
Claims priority, application France, Dec. 27, 1984, 84 19876
Int. Cl.⁴ B65D *85/24, 83/02*
U.S. Cl. 206—459 **19 Claims**



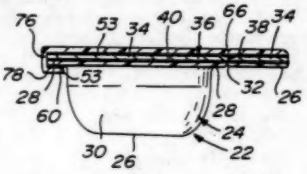
1. Package containing elongate articles extending generally parallel to each other, said package comprising a trough-like body having one open side, an outwardly projecting peripheral rim on said open side, a peel-off film closing said open side and being attached to said rim, and at least one reference mark in said rim and said film, said articles having a length dimension, said reference marks defining means for facilitating peeling-off of a part only of said film generally transversely to the length of articles leaving a remaining part of said film adhered to said rim, said remaining part of said film constituting means for retaining articles in the partially opened package.

4,673,086

MOISTURE IMPERVIOUS MEANS FOR UNIT DOSE PACKAGING

Milton Braverman, 640 Wynmill Pl., Philadelphia, Pa. 19115, and Leonard Zink, Philadelphia, Pa., assignors to Milton Braverman, Philadelphia, Pa.

PCT No. PCT/US81/00343, § 371 Date Mar. 19, 1981, § 102(e) Date Mar. 19, 1981, PCT Pub. No. WO81/02875, PCT Pub. Date Oct. 15, 1981
PCT Filed Mar. 19, 1981, Ser. No. 666,450
The portion of the term of this patent subsequent to Feb. 23, 1999, has been disclaimed.
Int. Cl.⁴ B65D *83/04, 85/56*
U.S. Cl. 206—538 **23 Claims**



1. A moisture impervious barrier for use on a multi-compartment medicinal dispensing device having a base to which a cover sheet is secured, said cover sheet including plural closures releasably secured to one another along weakened lines, said barrier comprising a sheet formed of a moisture impervious material and having a central portion, a top edge portion, a bottom edge portion and an opposed pair of side edge portions, said central portion and edge portions each including an inner surface having an adhesive thereon, each of said edge

portions being in the form of a elongated foldable flap, said central portion corresponding in size with the cover sheet of said dispensing device and including weakened lines corresponding to the weakened lines of the cover sheet, said barrier sheet being permanently securable to said cover sheet by disposing the barrier sheet on the cover sheet so that said adhesive contacts the cover sheet and with the weakened lines of the barrier sheet being coincident with the weakened lines of the cover sheet and with said flaps being folded around the edges of said cover sheet and into engagement with said base.

4,673,087

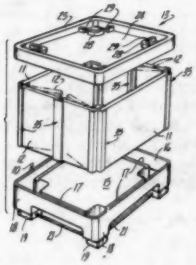
COLLAPSABLE, REUSABLE CONTAINER SYSTEM

Daniel D. Webb, Troy, Mich., assignor to Peninsula Plastics Co., Inc., Auburn Hills, Mich.

Filed Nov. 4, 1985, Ser. No. 794,898

Int. Cl.[4] B32B *27/00*; B65D *19/18, 6/22, 21/06*

U.S. Cl. 206—600 **7 Claims**



1. A collapsable, reusable container comprising:

a flat, rigid base and four, normally vertically arranged, wall forming panels which are connected together along their adjacent vertical edges by hinge-like corner connectors, and whose lower edges rest upon the base;

said corner connectors being formed of an initially flat, sheet-like base made of a single plastic extrusion which is longitudinally divided into an integral flexible center section stripe and opposite side edge, rigid, section stripes said connectors including roughly parallel flanges integrally formed on the connector base and extending outwardly from the same side of the connector base at each longitudinal edge of each of the rigid edge sections so that each rigid edge section forms the base, and its flanges form the legs, of a U-shaped channel, and the channels snugly receive the portions defining the vertical edges of the panels;

each of said corner connectors being bendable from a first position wherein said flanges and attached panels are substantially parallel to one another and said sheet-like base is substantially flat to a second position wherein said flanges and attached panels are perpendicular to one another and said center section stripe is bent at approximately a right angle

whereby the panels may be folded about the connector flexible center sections into a generally flat relationship for storage and handling.

4,673,088

SKI STORAGE RACK

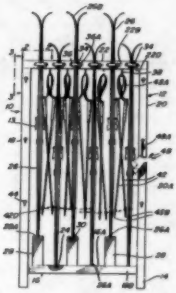
Donato Mancini, 1267 Coupal Street, Carignan, Province of Quebec, Canada J3L 3P9

Filed Aug. 5, 1986, Ser. No. 893,361

Int. Cl.[4] A47F *7/00*

U.S. Cl. 211—70.5 **6 Claims**

1. A rack for supporting at least two pairs of skis in side-by-side, spaced upright positions, with the running faces of the two skis of anyone pair in face-to-face contact, comprising: a main open quadrangular rigid frame adapted to be positioned upright, made of interconnected top bottom and side members; the top face of said bottom member having at least one first cavity for receiving the bottom edges of one pair of upright skis, and at least one short post upwardly projecting from said bottom member top face spacedly from said first cavity and defining a top end having a second cavity for receiving the bottom edges of another pair of skis, whereby the curved front ski tips and the boot bindings of said one pair of skis are vertically downwardly offset from the ski tips and boot bindigs of said another pair of skis; further including slots made through



the front face of said top member and extending through the top and bottom faces thereof but short of the rear face thereof, each of said slots in vertical register with one of said first and second cavities for engagement by the upper portion of a given pair of skis; and closure members to close the open end of said slots, said pairs of skis being vertically slidable within said slots, said slots of a depth and width to receive and retain a pair of skis in a position with their running faces generally normal to the plane of said rack, the spacing between adjacent slots being such that the ski tip and boot binding of one ski of one pair are respectively interdigitated with the ski tip and boot binding of the adjacent facing ski of the other pair.

4,673,089

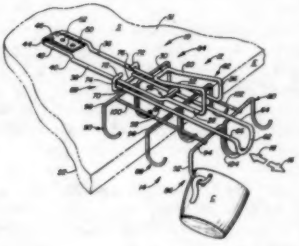
SLIDING MUG/CUP ORGANIZER

John P. Chap, Lemont, Ill., assignor to Selfix, Inc., Chicago, Ill.

Filed Oct. 18, 1985, Ser. No. 788,943

Int. Cl.[4] A47F *5/01*

U.S. Cl. 211—71 **23 Claims**



1. An article organizing assembly affixable to a panel comprising:

means slidably engageable with the panel for support thereby; and

means, coupled to and translatable with respect to said engaging means, for supporting selected articles adjacent to and offset from a surface of the panel, said article support-

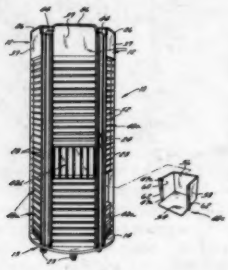
ing means including first and second spaced apart, elongated wire members joined by C-shaped means for translatably coupling said elongated wire members to said engaging means.

4,673,090

MODULAR EXPANDABLE MERCHANDISE DISPLAY RACK

Louis J. Crosslen, Saukville, Wis., assignor to Frank Mayer & Associates, Grafton, Wis.

Filed Apr. 14, 1986, Ser. No. 851,971
Int. Cl.[4] A47F 5/00
U.S. Cl. 211—183 **12 Claims**



1. In a multi-sided merchandise display rack for retail display of items to be selected by a customer, the combination comprising:

a horizontally disposed base means at the bottom thereof;

a plurality of pairs of module side brackets, each said pair defining a hinge removably supported by said base means, arranged horizontally spaced apart about the periphery of said base means, and extending generally upward and approximately co-extensive with the height of said rack, wherein each bracket of each said pair is pivotable and removable with respect to the other bracket of said pair; and

display means connected between one module side bracket of one pair and the opposite module side bracket of an adjacent pair to form each side of said rack, such that the number of sides of said rack can be increased and reduced by insertion and removal, respectively, of one or more sides, and such that the remaining sides pivot at said hinge to adjust for said removed and inserted sides;

each of said module side brackets of each pair including tube means having a C-shaped cross section co-extensive therewith and sized so as to engage the tube means of the opposite one of said pair, an inner tube being inside an outer tube, and so as to be slidable lengthwise and pivotable about the center axis of said tube with respect to said opposite one, so as to comprise said hinge;

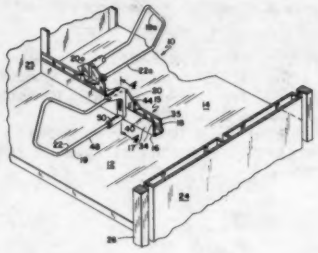
each of said inner tubes being tapped at least at the bottom thereof, allowing each of said pairs of module side brackets to be attached to said base means by means of screws inserted through said base means and threaded into said tapped inner tubes, thereby providing an attachment of said pairs of module side brackets to said base means.

4,673,091

SLIDING FILE SUPPORT FOR A DUAL ACCESS FILING SYSTEM

Hugh A. Robinson, Wenham, Mass., assignor to Andrew Wilson Company, Lawrence, Mass.

Filed Jan. 7, 1986, Ser. No. 816,704
Int. Cl.[4] A47F 5/00
U.S. Cl. 211—184 **7 Claims**



1. A dual accesss filing system comprising:

a shelf for holding a stack of files or the like;

a central longitudinal rail with a U-shaped, upwardly open longitudinal channel with side walls; one of the channel side walls having an outwardly facing surface and having at the upward opening a longitudinal lip with an inwardly facing surface;

a sliding file support comprising a rigid loop and a slider in which the loop is carried;

the slider having a body carrying inside and outside walls for bearing respectively against the outer and inner surfaces of the one wall and also having a ledge between the slider walls for riding along the top of the one wall;

whereby the slider walls may clasp between them the inside and outside surfaces of the one wall, thereby to clasp the one channel wall in sliding engagement with the ledge riding along the top of the one wall and with the loop extending in a plane at right angles to the channel over the shelf in a position to act as a stop against the one side of the file stack;

said slider further having a hook longitudinally displaced from the ledge for engaging with the one wall lip;

whereby the slider may be engaged to slide along the one wall by tipping the body about an axis normal to the channel longitudinal length to engage by hooking the hook under the lip and then slipping the bearing walls and the ledge into clasping, sliding engagement, and may be disengaged from sliding engagement by tipping the body about said axis and then backwards, then disengaging the hook.

4,673,092

MULTI-LEVEL RACK ASSEMBLY

Frederick W. Lamson, Birmingham; Richard Lansing, Livonia; Robert Decheim, Fenton, and William Martin, Milford, all of Mich., assignors to Lockwood Manufacturing Company, Livonia, Mich.

Filed Sep. 30, 1985, Ser. No. 782,093
Int. Cl.[4] A47B 47/00
U.S. Cl. 211—188 **8 Claims**

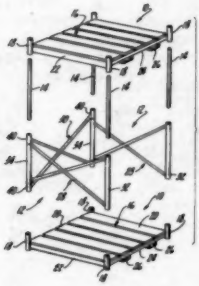
1. A multi-level rack assembly comprising:

(A) upper and lower base members each including a polygonal platform portion and an upstanding tubular portion at each corner of the platform portion;

(B) a plurality of side support members upstandingly and removably positioned between said upper and lower base members and each comprising a pair of vertically extending and laterally spaced tube means and truss means interconnecting the spaced tube means, each of said tube means

having an inner diameter corresponding to an inner diameter of said base member tubular portion, extending between said upper and lower base members and axially aligned with respective tubular portions of said upper and lower base members, an upper end of at least one of said vertically extending tube means of said side support members abuttingly engaging a tubular portion of the upper platform member and a lower end of said at least one of said vertically extending tube means abuttingly engaging the corresponding tubular portion of the lower tubular member so that said at least one tube means transfers the loading imposed on said upper base member to said lower base member;

(C) an elongated locating and aligning core rod respectively slidably received within each of said tube means, each of said core rods having a constant diameter throughout its length less than said inner diameter of said base member tubular portions and of said tube means and having a



length exceeding the length of the respective tube means so that each rod projects out of the upper and lower ends of the respective tube means for slidable locating receipt of the projecting upper end in the corresponding tubular portion of the upper base member and for slidable locating receipt of the projecting lower end in the corresponding tubular portion of the lower base member; and

(D) means preventing movement of said projecting lower ends of said core rods downwardly through said tubular portions of said lower base member whereby said rods locate said side members relative to said base members to facilitate assembly of the rack assembly, interconnect said base members and said side support members in the assembled condition of said rack assembly, and prevent relative lateral movement of said base members and said side support members by providing a continuous structural member extending through said tube means and into said upper and lower base members.

4,673,093

PROCESS FOR MOORING A CRANE FOR HEAVY LOADS

Hendrik Van Ketel, Maasluis, Netherlands, assignor to Gusto Engineering C.V., Schiedam, Netherlands

PCT No. PCT/NL85/00029, § 371 Date Mar. 14, 1986, § 102(e) Date Mar. 14, 1986, PCT Pub. No. WO86/00608, PCT Pub. Date Jan. 30, 1986

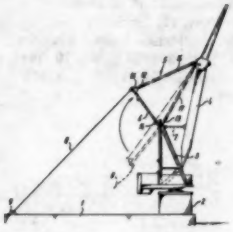
PCT Filed Jul. 16, 1985, Ser. No. 857,707

Claims priority, application Netherlands, Jul. 17, 1984, 8402263

Int. Cl.[4] B66C *23/26*

U.S. Cl. 212—175 **3 Claims**

1. A process for mooring a crane having a crane jib which is hingedly connected to a slewing frame, luffing wires for luffing the crane jib in and out, and a guy mast hingedly connected with the top of the frame, the luffing wires passing about hoisting blocks at the top of the frame, the process comprising positioning the crane jib in a fully luffed-in position, connecting at least one guy wire between a fixed point at a distance from the crane and the free end of said guy mast, detaching some of the luffing hoisting blocks from the frame and shifting



said blocks toward the free end of the guy mast and attaching the shifted blocks to said free end of the guy mast, tightening the luffing wires to swing the guy mast to a position to tension the guy wire by raising that end of the guy wire which is secured to the guy mast, and luffing out the crane jib.

4,673,094

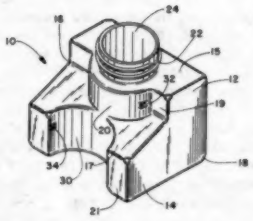
LARGE STUB SPOUT BOTTLES AND MATED COMBINATION UNIT

Juris M. Mednis, Howell, N.J., assignor to Universal Symetrics Corporation, Howell, N.J.

Filed Sep. 22, 1986, Ser. No. 910,366

Int. Cl.[4] B65D *21/02*

U.S. Cl. 215—10 **11 Claims**



1. A bottle comprising a hollow, L-shaped body having a vertically extended portion and a horizontally extended portion connected to each other to form an inner corner edge and an outer corner edge, generally L-shaped side walls, a rear wall and bottom wall connected to the rear wall along the outer corner edge, a lower top shoulder atop the horizontally extended portion and an upper top shoulder atop the vertically extended portion, a vertically extended inner front wall connected between the upper top shoulder and lower top shoulder and connected along the inner corner edge to the lower top shoulder, an outer front wall connected between the lower top shoulder and bottom wall and between the side walls, and a hollow neck portion made in one piece with said L-shaped body, said neck portion comprising a convex neck rib projecting from the inner front wall and extending from the lower top surface to the upper top surface, said neck portion having a discharge opening, the outer front wall having a concave recess, the concave recess and the neck rib having complimentary cross-sectional shapes taken in a plane which is parallel to bottom wall, said recess extending from the lower top shoulder toward the bottom wall and having a length selected so as to receive the neck portion of another bottle.

4,673,095

CLOSURE DEVICE FOR CONTAINERS

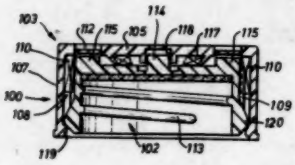
Peter J. Puresevic, 42, The Ridings, Tonteg, Pontypridd; Julian D. Taylor, 1, Fairway, Drive, Pwllypant, Caerphilly, both of Mid Glamorgan, and Denis O'Sullivan, 4, Alwyn Drive, Barry, South Glamorgan, all of Wales

Filed Nov. 12, 1985, Ser. No. 796,338

Claims priority, application United Kingdom, Nov. 12, 1984, 8428547; Jan. 24, 1985, 8501843; Jan. 29, 1985, 8502181

Int. Cl.[4] B65D 55/02, 85/56

U.S. Cl. 215—220 16 Claims



1. A closure device for a container with a cylindrical opening, comprising:

(i) first and second cylindrical closure members each with an end member and a cylindrical skirt member;

(ii) resilient means between the first and second cylindrical closure members for normally biasing the respective end members apart;

(iii) first drive means between the respective cylindrical skirt members of said first and second closure members for driving the members in unison in one direction only to mount the closure on the opening;

(iv) second drive means operative on application of axial pressure to the closure to drive the closure in the opposite direction for removal from the opening, the second drive means including:

(a) an orifice through one end member; and

(b) a projection on the other end member; whereby on axial movement of the first and second members towards one another to overcome the bias of the resilient means and on engagement of the projection in the orifice, the closure members are turnable in unison in said opposite direction to remove the device from the opening; and

(v) removable cover means at least partly closing the orifice in said normally biased apart position of the first and second cylindrical closure members for enabling a user to determine whether initial opening of the container has occurred.

4,673,096

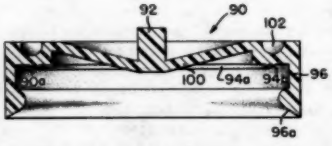
CLOSURE AND ROTATABLE LINER

Edward J. Towns, Morristown; Edward M. Brown, Livingston, both of N.J., and William M. Lester, DelRay Beach, Fla., assignors to TBL Development Corporation, Livingston, N.J.

Filed Dec. 23, 1985, Ser. No. 812,777

Int. Cl.[4] B65D 41/04

U.S. Cl. 215—230 12 Claims



1. A container closure comprising a liner and a closure member, said closure member having a top panel, a skirt depending from said top panel and skirt interior threading, said skirt defining an interior cylindrical recess, said skirt having interior projection means located axially between said recess and said threading for axial retention of said liner, said liner having a cylindrical sidewall nested in said recess for rotation in said closure member, said liner having a first surface in facing relation to said top panel and a second surface opposite such first liner surface, said liner having first means projecting outwardly of said first liner surface for limiting engagement between said first liner surface and said top panel, said liner having second means depending from said second surface for sealing engagement with such container.

4,673,097

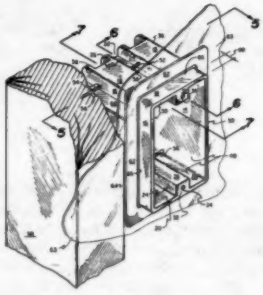
ELECTRICAL BOX WITH INTEGRAL AIR AND MOISTURE BARRIER

Larry J. Schuldt, 145 Meadowlark, Shelley, Id. 83274

Filed May 28, 1986, Ser. No. 867,651

Int. Cl.[4] H02G 3/08

U.S. Cl. 220—3.5 9 Claims



1. A one-piece electrical box impervious to passage of air and moisture between an exterior environment and an interior environment and in which commercial and residential electrical power is made available, the electrical box comprising:

side, top, bottom and back relatively thin integral wall means defining a sealed impervious receptacle open only at the front thereof and sized to receive an electrical switch, socket or the like:

knock out means initially forming an impervious integral part of the wall means, the knock-out means comprising frangible web means located and sized to create an aperture along the web means when the knock-out means are removed which aperture snugly and substantially imperviously receives a sheathed electrical wire to service the switch, socket or the like;

means integral with the wall means by which the box is internally secured to a building wall or like structure prior to the construction of an adjacent finish wall layer;

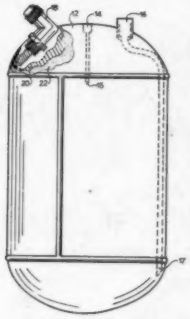
air and moisture barrier flange means having front surface means rearwardly offset from the front opening of the box by a distance substantially equal to the thickness of the yet to be constructed finish wall layer, the flange means extending transversely outwardly from the wall means, the flange means comprising an area adapted to be superimposed across and sealed directly or indirectly to the interior surface of the finish wall layer to create an imperviously sealed air and moisture site at the region between the front surface of the flange means and the back surface of the finish wall layer.

4,673,098

FUEL TANK VAPORIZATION AND EXPLOSION RESISTANT APPARATUS

Ronald L. Fenton, 465 Dominion Dr., Apt. 1208, Wood Dale, Ill. 60191, and William C. Sames, 37W545 Mills Court, St. Charles, Ill. 60174

Filed Aug. 25, 1986, Ser. No. 899,716
Int. Cl.[4] B65D *25/00*
U.S. Cl. 220—88 A **7 Claims**



1. An improved tank apparatus for liquid fuel storage comprising:

a closed tank member having means for selective access to the contents of said tank; and

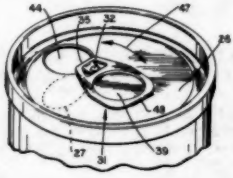
a heat conductive filler within said tank attached in heat conductive contact with said tank member for transmitting heat by conduction from said tank member to the liquid.

4,673,099

RECLOSABLE SELF-OPENING CAN END

Robert A. Wells, Box 995723, Steamboat Village, Colo. 80499

Filed Aug. 23, 1982, Ser. No. 410,422
Int. Cl.[4] B65D *41/32*
U.S. Cl. 220—269 **15 Claims**



1. Selectably reclosable easy opening apparatus for a container, comprising:

a container wall;

a selectably openable panel defined in said wall at least in part by a selectably separable region of predetermined weakness formed in the container wall;

a unitary opening and reclosure member pivotably attached to said wall and having a hinge connection permitting selectable movement of said member on a first path substantially normal to the container wall; said pivotable attachment allowing the unitary opening member to undergo movement on a second path substantially parallel to the container wall;

said opening member having a finger portion overlying said openable panel in position to apply force downwardly against the openable panel in response to movement of the opening member about said hinge connection along said first path, thereby separating said separable region and displacing said panel downwardly relative to said wall, so that an opening is formed in said wall by separation and downward displacement of said panel;

said unitary opening member having reclosure plug means confronting the container wall at a location displaced from said openable panel while said finger portion overlies the openable panel; and

said plug means being located on the opening member in relation to said pivotable attachment so as to be selectably registrable with said opening by pivoting said opening member on said second path after said opening is formed;

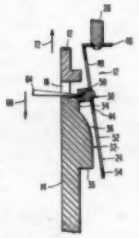
so that the container may be opened by hinging the opening member on said first path, and thereafter may be reclosed by pivoting the opening member on said second path and urging said plug means into removable engagement with the container wall adjacent said opening therein.

4,673,100

EQUIPMENT ENCLOSURE FASTENING MEANS

Mario J. J. M. P. D. Reis, and John Couper, both of West Lothian, Scotland, assignors to Burroughs Corporation, Detroit, Mich.

Filed Jul. 9, 1986, Ser. No. 883,531
Claims priority, application United Kingdom, Oct. 25, 1985, 8526400
Int. Cl.[4] B65D *45/16*
U.S. Cl. 220—324 **24 Claims**



1. An enclosure for holding equipment in its interior, said enclosure being openable to provide access to the equipment by separation of first and second attached case portions, said first case portion including a first retaining clip portion on an interior surface thereof and said second case portion including an elastic arm in association with an interior surface thereof, said elastic arm being displacable, as said enclosure is closed, away from said interior surface of said second case portion for said first clip portion to engage and be held in a second retaining clip portion on said elastic arm, where said first case portion includes an aperture and where said elastic arm includes means, operative when urged towards said interior of said enclosure through said aperture, for urging said elastic arm towards said interior to disengage said first and second clip portions, said means further for maintaining said first and second clip portions disengaged until said first and second case portions are moved apart.

4,673,101

EVACUABLE CHAMBER ENCLOSING

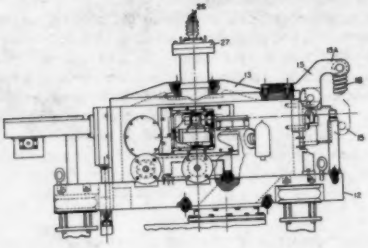
Nicholas Guarino, Arlington; Gabriel Onorio, Gloucester, and Billy W. Ward, Rockport, all of Mass., assignors to Micrion Limited Partnership, Beverly, Mass.

Filed May 8, 1986, Ser. No. 861,046
Int. Cl.[4] B65D *43/24*
U.S. Cl. 220—335 **2 Claims**

1. In a heavy evacuable vessel having a wall seated on a base and cover means for coacting with said wall and base for

sealing said evacuable vessel in vacuum tight relationship while being capable of withstanding atmospheric pressure when the vessel is evacuated the improvement comprising,

hinge means having a hinge axis for hingeably attaching said cover means to said wall allowing said cover means to pivot about the hinge axis between a closed position in which the cover means is substantially horizontal and an



open position in which the cover means is substantially vertical,

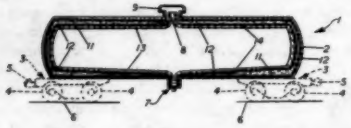
and spring means connected between said cover means and said base for counterbalancing the moment of said cover means about said hinge axis over a range between said cover means being substantially horizontal and said cover means being substantially vertical.

4,673,102

PROTECTIVE COATINGS AND METHOD FOR PROTECTING TANK CAR CONTAINERS

Thomas W. Bullock, Jr., 3321 Pines Rd., Shreveport, La. 71119

Filed May 2, 1985, Ser. No. 700,083
Int. Cl.[4] B61D *27/00*
U.S. Cl. 220—457 **12 Claims**



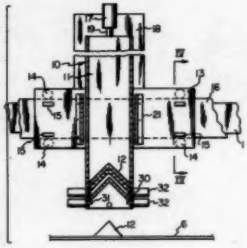
1. In a steel vessel having a carbon steel container, a carbon steel outer shell surrounding the container and polyurethane insulation located between the container and the outer shell, the improvement in combination therewith comprising at least one coat of a first protective coating on the outside surface of the container and lying adjacent the polyurethane insulation said protective coating being properly dried and cured before the polyurethane insulation comes into contact therewith, said protective coating being able to withstand contraction and expansion of said container due to thermal variations and said protective coating effectively isolating said container from said polyurethane insulation, thus preventing water, generated by condensation, and acid, produced by a reaction between water and the polyurethane insulation, from coming into contact with and damaging the outside surface of said container.

4,673,103

APPARATUS FOR PLACING POINT SUPPORTS ON A METAL CUTTING TABLE

Harry E. Anderson, 307 Foxcroft Rd., Pittsburgh, Pa. 15220, and Raymond E. Heasley, 38 Silver Ln., McKees Rocks, Pa. 15136

Division of Ser. No. 680,165, Dec. 10, 1984, Pat. No. 4,570,907. This application Aug. 15, 1985, Ser. No. 765,833
Int. Cl.[4] A24F *15/04;* **B65G** *59/00*
U.S. Cl. 221—186 **14 Claims**



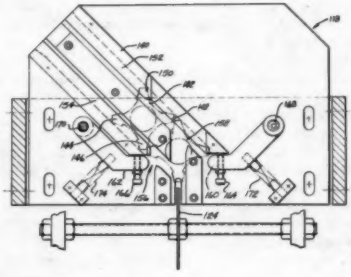
7. A dispenser unit adapted to carry a plurality of individual point support members, said dispenser unit having at least one non-rotatable tube with an open lower end, means mounting said tube on a carriage having a plurality of rollers adapted to travel on a beam, said means mounting said tube on said carriage permitting vertical movement of said tube relative to said carriage, a set of movable lower pins extending into said tube adjacent said open lower end, a set of movable upper pins located above said set of lower pins and extending into said tube, and means attached to the outside of said tube and to the outer end of each pin in each of said sets of movable pins to extend and retract said pins into and out of the interior of said tube to selectively release individual point support members from said open lower end to directly deposit by the force of gravity individual point support members on a cutting table in a cutting machine to support workpieces on the cutting table at locations predetermined by the size and shape of metal parts to be cut from workpieces supported on the cutting table.

4,673,104

MOLDED CLIP REORIENTER AND APPLICATOR

James S. Bader, Lakewood, Colo., assignor to Adolph Coors Company, Golden, Colo.

Division of Ser. No. 602,502, Apr. 20, 1984, Pat. No. 4,599,848. This application Mar. 17, 1986, Ser. No. 840,061
Int. Cl.[4] B65B *27/04;* **B65H** *3/00*
U.S. Cl. 221—261 **4 Claims**



1. A device for reorienting plastic molded clips from a trans-

verse cross configuration to a longitudinal cross configuration comprising:

alignment guide means for transporting said clips in said transverse cross configuration;

retaining means for releasably retaining said clips in said alignment guide means such that said clips can be removed from said alignment guide means at a predetermined angle;

clip removal means for sequentially displacing said clips from said retaining means at said predetermined angle;

alignment track means disposed to engage said clips displaced from said retaining means at said predetermined angle that said clips are disposed in said alignment track means in a longitudinal cross configuration;

said retaining means comprising spring loaded holder means for holding said clips in said alignment guide means to produce substantially equal forces on opposing arm portions of said clips during removal of said clips from said alignment guide means at said predetermined angle to ensure engagement of said clips means with said alignment track means;

said spring loaded holder means comprises abutting surface means for retaining said clips; and

holder adjustment means for aligning said clips with said alignment track means.

4,673,105

DISPENSING MECHANISM FOR VENDING MACHINES

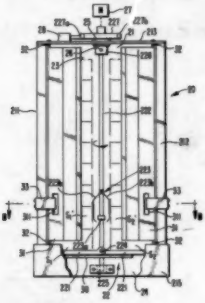
Akihito Kurosawa, and Osamu Anazawa, both of Maebashi, Japan, assignors to Sanden Corporation, Gunma, Japan

Filed Jul. 30, 1985, Ser. No. 760,639

Claims priority, application Japan, Jul. 31, 1984, 59-116323[U]

Int. Cl.[4] B65G *59/06*

U.S. Cl. 221—281 **2 Claims**



1. In an article dispensing mechanism for dispensing articles from a vending machine including an article storage area defined by two side plates, a back plate and an upper plate to hold stacked articles and a dispensing mechanism, said storage area being provided with a front opening for loading the articles thereinto and a bottom opening for dispensing the lowermost stacked articles, said dispensing mechanism including a rotatable shaft extending through the article storage area, an article holding device disposed on the lower portion of said rotatable shaft to control the dispensing operation of the lowermost stacked articles in accordance with the rotation of said rotatable shaft and a holder member fixed on said rotatable shaft, said holder member having a holding portion for holding the desired number of articles stacked on the lower most articles by pressing the lowermost articles outwardly against said sideplates while the dispensing operation proceeds, the improvement comprising means for preventing substantial deformation of said side plates, said deformation preventing means including a deformation preventing element fixed on each of said side plates at a position opposed to said holder member and a stopper plate disposed adjacent each of said side plates and pivotally coupled to said vending machine to partly cover said front opening when said stopper plates are in a closed position, each of said deformation preventing elements being engaged wtih its corresponding stopper plate to prevent substantial deformation of said side plates.

4,673,106

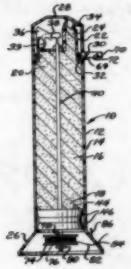
DISPENSER FOR RETAINING TOOTHBRUSH AND FLOSS

Steven Fishman, Edison, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Oct. 23, 1985, Ser. No. 790,510

Int. Cl.[4] B65D *25/38*

U.S. Cl. 222—80 **5 Claims**



1. A dispenser, comprising:

a container having a wall defining an elongated chamber to retain a flowable material, a nozzle adjacent an upper portion of the chamber defining an outlet orifice, and a hollow base adjacent a lower portion of the container and having an opening extending through a side of the base;

an elongated rod extending longitudinally through a central portion of the chamber;

a plunger located in the chamber and sealingly engaging against an inner surface of the wall, with said rod extending through a central portion of the plunger to a location below the plunger, said plunger having clip means slidably engaging against the rod;

means for reciprocating the rod in the chamber to move the plunger upwardly in the chamber and pump a portion of the material through the orifice;

a spool rotatably received on a lower portion of the rod at a location below the plunger; and

an elongated strand of floss wound upon the spool and extending through the opening.

4,673,107

TWO-COMPARTMENT DOSING PACKAGE

Gerhard Obrist, Kaiseraugst, Switzerland, assignor to Sterling Drug, Inc., New York, N.Y.

Filed Aug. 7, 1984, Ser. No. 638,504

Claims priority, application Switzerland, Aug. 16, 1983, 4450/83

Int. Cl.[4] B65D *83/14*; G01F *11/36*

U.S. Cl. 222—94 **5 Claims**

1. A two-compartment package, comprising:

an outer container for a first package component and having an interior space;

a cover provided on said outer container;

a first dispensing valve mounted in said cover;

an inner container for a second package component and for a propellant and arranged within said outer container;

a second dispensing valve provided for said inner container;

said outer container being constructed as a two-chamber system;

said two-chamber system comprising a flexible sack arranged within said outer container for containing said first package component and said inner container;

said flexible sack and said outer container defining an intermediate space therebetween;

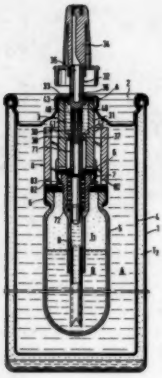
a propellant occupying said intermediate space for pressing said first package component into said first dispensing valve;

a hollow stem for operating said first dispensing valve and for jointly dispensing said first and second package components;

a housing in said outer container defining a dosage chamber provided for said first dispensing valve;

said hollow stem comprising a coaxially hollow extension extending into said dosage chamber;

said extention having a valving surface thereon which effects the opening and closing of said dosage chamber with respect to said outer container;



said sodage chamber communicating with said interior space of said outer container when said first dispensing valve is closed;

said dosage chamber being closed relative to said outer container and connected with the exterior of the two-compartment package via said hollow stem when said first dispensing valve is open;

said second dispensing valve being flow-communicatingly connected with said dosage chamber;

said second dispensing valve being constructed as a dosage valve for dispensing a pre-determined quantity of said second package component into said dosage chamber during each operation of said second dispensing valve; and

means for coupling said first and second dispensing valves such that opening said first dispensing valve concurrently opens said second dispensing valve and both said first and second package components present in said dosage chamber are jointly dispensed through said first dispensing valve.

4,673,108

BEVERAGE DISPENSING GUN

Heiko T. de Man, 33,000 S. Highway 1, Gualala, Calif. 95445

Filed Dec. 23, 1983, Ser. No. 564,988

Int. Cl.[4] B67D *5/06;* **H01H** *9/04, 13/06, 13/70*

U.S. Cl. 222—144.5 **22 Claims**

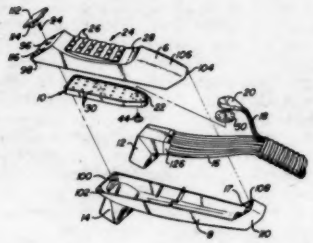
1. A beverage dispensing gun for selectively dispensing a plurality of liquids provided the gun along a plurality of liquid lines comprising:

a case having a liquid line inlet;

a nozzle mounted to said case and fluidly connected to the liquid lines;

a switch board, mounted within the case, including an array of user actuated pressure sensitive switches for controlling the flow of liquid from the liquid lines to the nozzle;

the switch board further including a plurality of first contacts arranged in a chosen pattern on said switch board;



a connector including plurality of second contacts arranged in said chosen pattern for mating engagement with said first contacts; and

means for sealingly and removably securing said connector to said switch board, said connector securing means including a resilient sealing member positioned between the connector and the switch board.

4,673,109

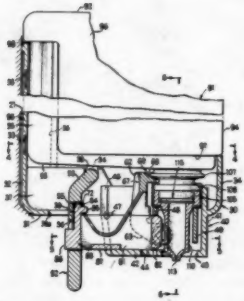
LIQUID SOAP DISPENSING SYSTEM

Antonio M. Cassia, Milan, Italy, assignor to Steiner Company, Inc., Chicago, Ill.

Filed Oct. 18, 1985, Ser. No. 788,964

Int. Cl.[4] B67D *5/06*

U.S. Cl. 222—153 **21 Claims**



1. In a liquid soap dispensing system including a housing and a discharge mechanism carried thereby for movement between a normal retracted configuration and an actuating configuration for dispensing liquid soap from an associated cartridge, the improvement comprising: latch means carried by said housing for movement between a latching condition engageable with the associated cartridge for locking it in a dispensing position on the housing and an unlatching condition, and bias means interconnecting said latch means and the discharge mechanism for resiliently urging said latch means to its latching condition and said discharge mechanism to its retracted configuration.

15. A disposable refill cartridge for a liquid soap dispenser, said cartridge comprising: a closed container having a bottom wall portion and a rear wall portion and two opposed side wall portions, an outlet opening formed in said bottom wall portion,

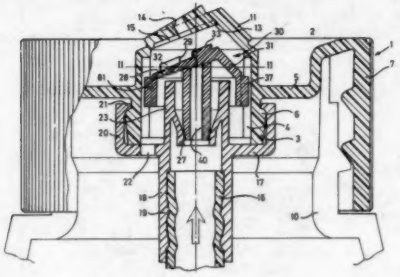
means closing said outlet opening, two elongated recesses respectively formed in said side wall portions adjacent to said rear wall portion, each of said recesses extending downwardly to said bottom wall portion, said container having stepped retaining surfaces at the upper end of said rear wall portion and at the lower ends of said side wall portions.

4,673,110

SPRAY-DISCHARGE DEVICE FOR A DEFORMABLE CONTAINER

Donald Workum, 10 Boulevard Saint Ruf, 84000 Avignon, France

Filed Jun. 4, 1984, Ser. No. 616,942
Claims priority, application Spain, Jun. 14, 1983, 272902
Int. Cl.[4] B65D *25/40*; B05B *1/34*
U.S. Cl. 222—211 **17 Claims**



17. A spray-discharge device for a deformable container in which a pressure is developed for expelling a liquid from the container via an eductor tube and in which a partial vacuum is created in order to suck air into said container, said container having an orifice formed through a rigid cover which closes the container, wherein said device comprises said cover having an internal face fixedly positioned relative to the container, a valve unit which is capable of moving axially within the container with respect to the container cover between a spray-discharge position and an air-suction position, said valve unit having a first portion for shutting-off the eductor tube in its air-suction position and having a valve-cap portion, said valve cap portion defining a liquid flow channel extending from said eductor tube to a position spaced from said orifice, and an air flow channel which extends from a position outside of said eductor tube to said position spaced from said orifice, said liquid flow channel and said air flow channel meeting at an acute angle at said position spaced from said orifice, and a mixture channel in alignment with said air channel and extending from said position spaced from said orifice to said orifice, said mixture channel extending laterally from the liquid flow channel at said spaced positions.

4,673,111

NUT DISPENSING MACHINE

Arthur Gold, Northbrook, Ill., assignor to Carousel Industries, Inc., Morton Grove, Ill.

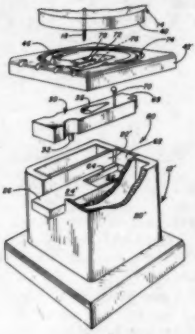
Filed Mar. 12, 1986, Ser. No. 838,804
Int. Cl.[4] G01F *11/10*
U.S. Cl. 222—305 **11 Claims**

1. A nut dispensing machine comprising:

a base;

a nut receptacle mounted on said base adapted to hold a plurality of nuts or other objects to be dispensed therein; and

nut dispensing means mounted in said base and communicating with an opening in said nut receptacle for dispensing nuts from said opening when said dispensing means are actuated, said dispensing means including an elongated slide reciprocally mounted on a support platform in a recess formed in said base and having a first end extending from said base for grasping to reciprocate said slide, said slide including a dispensing opening therethrough communicating on one side with said receptacle opening at a first position of said slide and communicating on the second side outside said platform to dispense the nuts or other objects from said nut receptacle, said slide including a



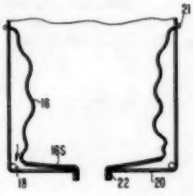
recess at the second end of said slide which communicates with said obstruction clearing opening to assist in clearing obstructions from said dispensing means, said support platform having an opening therethrough into a well in said base for clearing obstructions from said dispensing means, which opening does not communicate with said slide dispensing opening.

4,673,112

MATERIAL HANDLING BINS WITH INFLATABLE LINERS

Timothy C. Bonerb, North Conway, N.H., assignor to Vincent C. Bonerb, Boston, N.Y.

Continuation-in-part of Ser. No. 686,532, Dec. 26, 1984, which is a continuation-in-part of Ser. No. 500,821, Jun. 3, 1983, Pat. No. 4,574,984. This application Apr. 23, 1985, Ser. No. 726,328
Int. Cl.[4] B65D *88/62*
U.S. Cl. 222—386.5 **6 Claims**



1. A material-handling, pneumatic discharge-assisted, dual-walled, cup-shaped bag of the type having a flexible, generally cup-shaped, air impervious inner wall and a generally cup-shaped, air impervious outer wall providing an air impervious space therebetween capable of being inflated and deflated for the purpose of assisting material discharge when inflated and returning the inner wall of the membrane to an original cup-shaped position when deflated, the cup-shaped bag having a discharge opening in the bottom thereof, with the improvements comprising: stiffening means in a bottom wall portion of the inner wall for preventing the bottom portion of the inner wall from wrinkling after material discharge and on deflation, said stiffening means comprising a plurality of battens causing

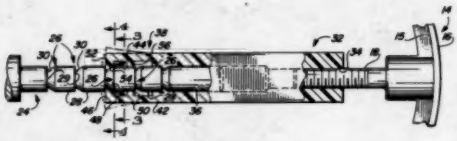
said bottom wall to fall flat without substantial wrinkles on deflation after discharging material from the bag.

4,673,113

HAT STRETCHER DEVICE

Orville Vandewege, Tempe, Ariz., assignor to Lester Thompson, Apache Junction, Ariz.

Filed May 19, 1986, Ser. No. 864,607
Int. Cl.[4] D06C 5/00; A47G 25/10, 25/66
U.S. Cl. 223—15 **10 Claims**



1. A hat stretching device comprising:

(a) first and second band means for placement in a hat to be stretched, said band means being in spaced relationship with each other;

(b) a threaded rod extending from said first band means toward said second band means;

(c) a ratchet bar extending from said second band means toward said first band means and in axial alignment with said threaded rod, said ratchet bar having at least a spaced apart pair of ratchet grooves formed therein;

(d) adjustment block means having a threaded bore on one end in which said threaded rod is mounted and having a smooth bore in its opposite end in which said ratchet bar is axially movable;

(e) pawl means on the opposite end of said adjustment block means and having a ratchet bar engaging position wherein said ratchet bar is movable in an axially extending direction relative to said adjustment block means to move a selected one of the ratchet grooves of said ratchet bar into latched engagement with said pawl means, said pawl means being movable into a ratchet bar disengaging position; and

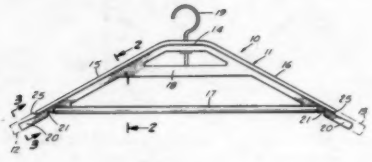
(f) release means associated with said pawl means for manually moving said pawl means between its ratchet bar engaging and disengaging positions.

4,673,114

GARMENT DRYING HANGER

Helen E. Douglas, 18536 Centennial, Hesperia, Calif. 92345

Filed Aug. 15, 1986, Ser. No. 896,831
Int. Cl.[4] A47G 25/44
U.S. Cl. 223—89 **1 Claim**



1. A garment hanger, comprising:

a body portion;

first and second arms affixed to opposite sides of the body portion, lying in the same plane and sloping away from said body portion in the same general direction, each said arm including a transversely extending groove opening extending in the same general direction as the sloping of the respective arm;

first and second stub shaft means affixed respectively to the ends of the arms; and

first and second extender arms each having an opening in an end portion thereof of such dimensions and geometry as to enable fitting receipt of a stub shaft therein, an end portion of the extender arm including detent means for releasable locking receipt within the arm groove when the stub shaft means is received within the extender arm opening, said extender arm end portion including the opening being curvedly tapered from a maximum thickness to a minimum thickness adjacent the detent; and

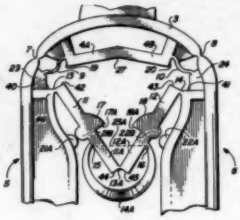
said arms and extender arms each having a generally rectangular cross-section portion and a rim extending along one side thereof with flangelike portions projecting from opposite sides of the rectangular portion.

4,673,115

UNITARY COLLAPSIBLE COAT HANGER

Romanus M. LaMont, Box F3, Wickenburg, Ariz. 85358

Filed Apr. 28, 1986, Ser. No. 856,488
Int. Cl.[4] A47G 25/40
U.S. Cl. 223—94 **14 Claims**



1. A hanger having an opened or erected configuration for supporting garments and a collapsed configuration, the hanger comprising in combination:

(a) a hook;

(b) a body attached to the hook;

(c) left and right support arms each having an outer surface for supporting a garment and an inner surface, and a first hinge strap connecting a left edge of the body to an inner end of the left support arm, and a second hinge strap connecting a right edge of the body to an inner end of the right support arm;

(d) left and right locking arms each having an inner end connected by means of a third hinge strap to the inner end of the other, an outer end of the left locking arm being connected by a fourth hinge strap to the inner surface of the left support arm, an outer end of the right locking arm being connected by a fifth hinge strap to the inner surface of the right support arm;

(e) a C-shaped spring that has a left end connected by a sixth hinge strap to an intermediate portion of the left support arm and a right end connected by means of a seventh hinge strap to an intermediate portion of the right locking arm; and

(f) frame stop means attached to the body for limiting upward pivoting of the left and right locking arms as the left and right support arms extend outward.

4,673,116

SPRING LOADED CLOTHES HANGER

Roger L. Keller, 5305 Palmetto, Houston, Tex. 77081

Filed Oct. 20, 1986, Ser. No. 921,036
Int. Cl.[4] A47G 25/42
U.S. Cl. 223—94 **5 Claims**

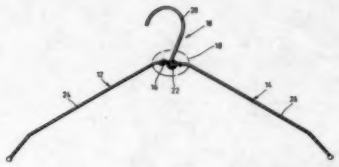
1. A spring loaded clothes hanger comprising,

a first member and a second member,

said first member having a supporting hook, a circular hinge section and a first supporting arm,

said second member having a second supporting arm, a pivoting axle extending through the circular section of the

first member for allowing the arms to move relative to each other, and a stop engagable with the top of the first supporting arm for limiting the extent of upward movement of the arms, and



spring means between the first and second members yieldably urging the first and second arms upwardly and away from each other to cause the stop to engage the first arm for supporting a garment but allowing the arms to move toward each other and release the garment.

4,673,117

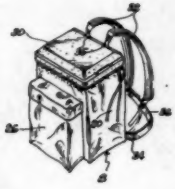
BACKPACK COOLER CONSTRUCTION

James D. Calton, 511 Amigos Rd., Ramona, Calif. 92065

Filed Feb. 3, 1986, Ser. No. 825,445

Int. Cl.[4] A45F *4/00*

U.S. Cl. 224—151 **6 Claims**



1. A backpack cooler construction comprising:

(a) an open-topped insulated body defining a well for containing cold beverages while keeping them cold;

(b) an insulated lid for covering the top of said body and maintaining said well substantially sealed from outside air;

(c) said body having a rigid insert and a cloth jacket substantially covering said insert;

(d) a pair of shoulder straps connected to said body and enabling a person to strap said body on his back for transport;

(e) said rigid insert having an upper rim and an external circumferential retaining groove adjacent said rim; and,

(f) said jacket defining an upper peripheral loop enclosing a retainer cord for engaging in said groove for retaining said jacket on said body.

4,673,118

SKI CARRYING APPARATUS

Kevin W. Kronz, Glendale, Ariz., assignor to KevKel, Inc., Phoenix, Ariz.

Filed Jan. 22, 1986, Ser. No. 820,976

Int. Cl.[4] A45F *3/00*

U.S. Cl. 224—259 **12 Claims**

1. Ski carrying apparatus for carrying a pair of skis and a pair of ski poles, comprising, in combination:

wrapping strip means, including a first wrapping strip portion, a second wrapping strip portion for holding a pair of skis, and first fastening means for securing the first wrapping strip portion to the second wrapping strip portion;

first strap means secured to the wrapping strip means for securing a pair of ski poles to the wrapping strip means and to the pair of skis, including second fastening means having

a first fastening portion secured to the first scrap means, and

a second fastening portion secured to the second wrapping strip portion, and the first fastening portion and the second fastening portion cooperates to secure the first strap

means the ski poles to the wrapping strip means and to the pair of skis; and

second strap means secured to the wrapping strip means to secure the wrapping strip means and the pair of skis and the first strap means and the pair of ski poles to a user's back.

4,673,119

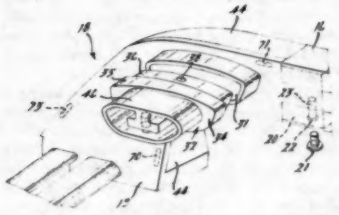
VEHICLE LUGGAGE CARRIER

John A. Bott, 931 Lake Shore Dr., Grosse Pointe Shores, Mich. 48236

Filed Mar. 4, 1985, Ser. No. 708,360

Int. Cl.[4] B60R *9/04*

U.S. Cl. 224—326 **7 Claims**



1. A luggage rack for an automobile having a horizontally disposed exterior body surface, comprising a pair of side members, at least one stanchion located at one end of each of said side members, each of said stanchions having a portion adapted for telescopic engagement with the adjacent end of an associated side member, wherein said side members are elevated from said body surface and each of said stanchions include a planar portion for separating an interior chamber of each said stanchion from the exterior of each said stanchion, a horizontally extending flange substantially surrounding a horizontal aperture in said planar portion of each of said stanchions, and cover means comprising at least a part of one exterior surface of said stanchion;

at least one transversely extending elongated cross member;

means for supporting said cross member at each end of said cross member comprising a support having a first extended portion telescopically engageable with said cross member, a second extended portion telescopically engageable with said stanchion into said aperture, and a collar engageable with and substantially covering said extended flange of said stanchion; and

means for fastening said support and said stanchion together

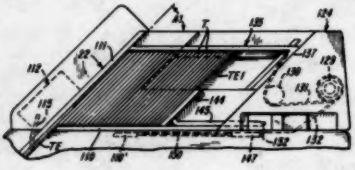
on one side of said planar portion wherein said cover means conceals said means for fastening said support when said cross member supporting means is secured to said stanchion on the other side of said planar portion.

4,673,120

HAND-HELD TAG ATTACHER, METHOD OF ATTACHING TAGS AND FASTENERS

Larry D. Strausburg, Kettering, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Sep. 25, 1984, Ser. No. 654,333
Int. Cl.[4] A43D *69/00*; **B23P** *19/02, 19/04*
U.S. Cl. 227—67 **12 Claims**



1. A hand-held tag attacher for attaching tags to merchandise using fasteners, each fastener having a bar section and a bottom section joined by a filament section, the attacher being solely manually powered and comprising: an attacher body having a hopper adapted to receive a stack of tags and a manually engageable handle, a needle mounted to the body and having an elongate needle bore and an elongate side opening communicating with the needle bore, means for feeding an endmost tag from the hopper to an attaching position in alignment with the needle, means for advancing one bar section of a fastener at a time into alignment with the needle bore, a push rod engageable with a bar section of a fastener and movable along an axis for driving the bar section through the needle bore while its filament section extends through the side opening, the hopper having a front wall sweeping rearwardly with respect to the front end portion of the body and at an oblique angle with respect to the axis to hold a stack of tags in a rhomboidal arrangement, means for moving the bar section advancing means, the push rod and the tag feeding means through a cycle, wherein the moving means includes a slide movably mounted on the body, manually operable actuating means disposed at the handle, means for coupling the actuating means to the slide to effect reciprocating movement of the slide upon actuation and release of the actuating means, means for coupling the slide to the push rod, means responsive to the movement of the slide for operating the bar section advancing means, and means for coupling the slide to the tag feeding means.

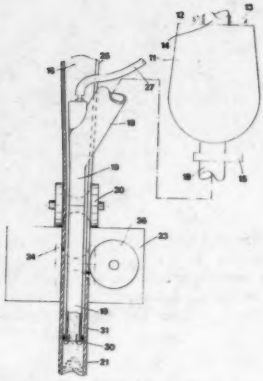
4,673,121

METHOD FOR CONTINUOUSLY PRODUCING A POWDER FILLED TUBULAR WELDING ELECTRODE

Werner Holmgren, Blodboksgatan 8, S-421 74 Västra Frölunda, Sweden

Filed Oct. 28, 1985, Ser. No. 792,311
Claims priority, application Sweden, Oct. 29, 1984, 8405400
Int. Cl.[4] H01B *13/06*
U.S. Cl. 228—148 **6 Claims**

1. In a method for continuously producing a powder filled tubular welding electrode wherein a metallic band while being fed longitudinally of itself is formed into a gutter and thereafter is formed into a tube by welding the edges of the gutter and wherein welding powder is supplied via a filling conduit opening into said tube, the improvement comprising introducing the welding powder into a container which is evacuated of an essential portion of its air content, introducing protective gas into the container until a positive gas pressure has been reached therein, and supplying gas-powder mixture from the container through said filling conduit to said tube while maintaining gas pressure in said conduit which is somewhat higher than the atmospheric pressure.

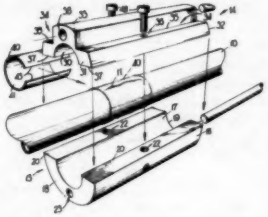


4,673,122

METHOD AND APPARATUS FOR REPAIRING COPPER PIPES

Thomas W. Dubey, 2601 Lower Roswell Rd., Marietta, Ga. 30062

Filed May 22, 1986, Ser. No. 865,847
Int. Cl.[4] B23K *31/00*
U.S. Cl. 228—119 **5 Claims**



1. Apparatus for repairing copper pipes comprising, in combination, a strip of solder coated copper adapted to be wrapped about a breached portion of a pipe to be repaired; a heat jacket having a plurality of elongated sections with each jacket section defining a portion of a cylindrical jacket bore and wherein at least one of said heat jacket sections is formed with an open ended elongated channel; an elongated electric heating element of a size and shape for removable insertion into said channel from the exterior of said jacket, and fastening means for fastening said heat jacket sections about the pipe.

4,673,123
FILLER FOR WELDING A HEAT RESISTANT NICKEL-BASE ALLOY

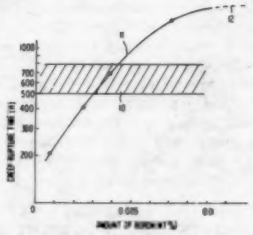
Shigeo Shin; Tamao Takatsu; Teiichiro Saito, all of Tokyo; Akiyoshi Kikuchi, and Tsuneo Nakanishi, both of Kanagawa, all of Japan, assignors to Nippon Welding Rod Co., Ltd.; Fuji Electric Company Ltd., both of Tokyo and Fuji Electric Corporate Research, Kanagawa, all of, Japan

Continuation of Ser. No. 539,353, Oct. 6, 1983, abandoned. This application May 7, 1985, Ser. No. 731,614

Claims priority, application Japan, Oct. 6, 1982, 57-175929; Nov. 4, 1982, 57-193728; Nov. 24, 1982, 57-205644

Int. Cl.⁴ C22C *19/03, 30/00*

U.S. Cl. 228—263.13 **4 Claims**



1. A process comprising welding two heat-resistant nickel-chromium-molybdenum-base alloy components together using as a filler a heat-resistant nickel-chromium-molybdenum-base alloy consisting essentially of:

0.05 to 0.15 wt % C; 20.05 to 23.00 wt % Cr; 0.5 to 2.50 wt % Co; 17.00 to 20.00 wt % Fe; up to 1.00 wt % Mn; 8.00 to 10.00 wt % Mo; up to 0.04 wt % P; up to 1.00 wt % Si; up to 0.03 wt % S; 0.2 to 1.00 wt % W; boron in an amount of 0.003 to 0.015 wt %; zirconium in an amount of 0.01 to 0.15 wt %; yttrium in an amount of 0.003 to 0.005 wt %; and lanthanum and cerium in an amount of 0.003 to 0.05 wt %; and the balance Ni; based on the total weight of the filler.

4,673,124
METHOD FOR ELIMINATING, OR MINIMIZING THE EFFECTS OF, DEFECTS IN MATERIALS

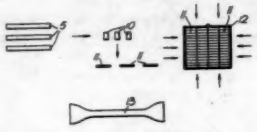
Ralph I. Conolly, Bristol, England, assignor to Rolls-Royce plc, London, England

Continuation of Ser. No. 550,558, Nov. 10, 1983, Pat. No. 4,628,008. This application Jul. 9, 1986, Ser. No. 883,704

Claims priority, application United Kingdom, Nov. 16, 1982, 8232721

Int. Cl.⁴ B23K *20/22, 20/14*

U.S. Cl. 228—170 **14 Claims**



1. A method for the manufacture of an article in a defect-immunized material comprising the steps of:

subjecting at least one initial body of material to a working process which imparts a high degree of plastic deformation thereto to produce an upset ratio of at least 5:1 along at least one principal axis of the body, thereby elongating defects in the initial body along said at least one principal axis,

cutting the deformed at least one body into a plurality of smaller pieces,

stacking at least some of the smaller pieces in a sealable container with said stacked smaller pieces arranged so that said elongated defects therein are oriented in a predetermined direction with respect to the direction of stress to be applied to the article of manufacture, the predetermined direction being selected so as to minimize adverse effects of said elongated defects on said article,

evacuating the container, and

bonding all of the pieces in the container together using a hot isostatic pressing technique to form the article.

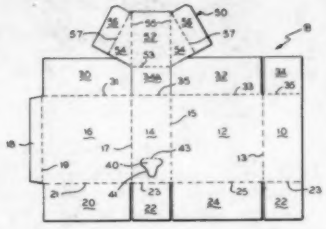
4,673,125
DISPENSING CONTAINER

Douglas L. Weaver, Middlesex, N.J., assignor to Container Corporation of America, Chicago, Ill.

Filed Jun. 23, 1986, Ser. No. 877,172

Int. Cl.⁴ B65D *5/50*

U.S. Cl. 229—17 B **2 Claims**



1. A blank of foldable sheet material, such as paperboard, adapted to form an outer container for use with in inner flexible bag in a composite package for holding and dispensing liquids, said blank being cut and scored to provide:

(a) a central body portion including a top wall panel, a first side wall panel, a bottom wall panel, a second side wall panel, and a glue panel foldable joined to each other along parallel fold lines;

(b) end wall forming panels foldably joined to opposite ends of said top, bottom, and side wall panels;

(c) said bottom wall panel including an integral dispensing tab formed from material thereof and detachably secured thereto adjacent one end thereof;

(d) a platform forming section located, at an opposite end of said bottom wall panel from said dispensing tab, and comprising:

(i) a deck panel foldably joined at one end to an outboard end of the end wall forming panel joined to said bottom wall panel;

(ii) a pair of generally triangularly shaped side panels foldably joined to opposite side edges of said deck panel;

(iii) a pair of generally rectangular anchor panels foldably joined to corresponding outer edges of respective side panels.

4,673,126
MOISTURE BARRIER CARTON WITH RECLOSABLE COVER

Thomas P. Hambleton, Thompson Ridge, N.Y., assignor to International Paper Company, New York, N.Y.

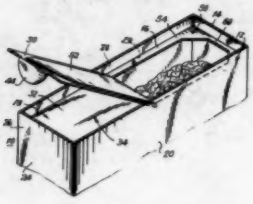
Filed Jul. 11, 1986, Ser. No. 884,579

Int. Cl.⁴ B65D *5/66, 43/16*

U.S. Cl. 229—43 **14 Claims**

1. A carton which comprises: an open ended body portion formed by an upright boundary wall, and a top end peripheral edge which define the carton opening; a first flange at the peripheral edge; a cover having an interior surface, first and second attachment section which are hingedly connected by a transverse score line, and release means for pivotal movement

of said second attachment section about the transverse score line, said cover having a dimension substantially equal to that of the carton opening; and a membrane liner including interior and exterior sides, a central area bounded by a central edge having substantially the same dimension as the cover, a perforated cut out area located in said central area which defines a pour spout, and means for securing the membrane to the carton, said means for securing the membrane to the carton including a second flange which extends outwardly from the central edge, said first flange being folded inwardly and overlapping said seocnd flange to effect a recessed attachment of said membrane and cover to the carton, said cut-out area being defined by rear and connecting boundary perforation lines, said interior surface of said cover being disposed in overlying



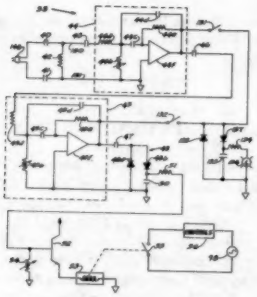
relation with respect to said central area with said rear perforation and transverse score lines substantially coinciding, said first section being affixed to said membrane, said second attachment section overlying and being affixed to said cut-out area, so that said second attachment section is maintained in closed orientation with respect to said carton opening by the attachment of said cut-out area, readily pivoting outwardly about said transverse line to provide a pour spout when the cut-out area perforations are broken, said second section pivoting through substantially 180 degrees to overlie said first section and releasably engage said first flange to provide unobstructed access to said pour spout, said second section pivoting to overlie said pour spout and releasably engage said first flange to provide a reclosure feature.

4,673,127

REMOTE CONTROL MEANS FOR HEATING/COOLING DEVICES

Willie T. Grant, 400 So. Simms St., Lakewood, Colo. 80228

Filed Jul. 17, 1986, Ser. No. 886,328
Int. Cl.[4] H04M *11/04*
U.S. Cl. 236—51 **2 Claims**



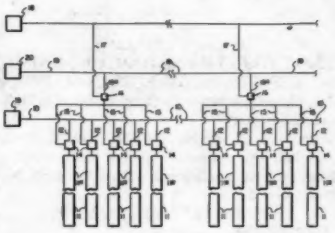
1. Transmitter/receiver means having IC timing means with frequency changing means, said frequency changing means permitting the generation and validation of a wide range of low-voltage frequencies transmissible over existing high-voltage conductors; said transmitter/receiver means having a signal generator comprising said IC timing means and said frequency changing means, said signal generator transmitting said low-voltage signal across buffer means to a low-voltage/-high-voltage interface, said interface comprising high-pass filtering means and coupling means, said low-voltage frequencies being impressed upon high-voltage waves, said high-voltage waves being carrier waves for low-voltage frequency waves; said signal generator being triggered through thermostatic means, said thermostatic means coupling said generator to power source means; a first receiver of receiver means of said transmitter/receiver means receiving said low-voltage frequencies at a low-voltage/high-voltage interface, said interface of said first receiver means comprising coupling means and high-pass filtering means, said first receiver means comprising variable frequency validation means, coupled with filtering means, and amplifying means combined with voltage rectifying means feeding to voltage storing means, and relay timing means, said storing means operating relay means, said relay means operating control means of external means.

4,673,128

METHOD AND SYSTEM FOR FURROW IRRIGATION

Jack Keller, Logan, and Glen E. Stringham, Millville, both of Utah, assignors to Utah State University Foundation, Logan, Utah

Continuation of Ser. No. 763,314, Aug. 6, 1985, Pat. No. 4,577,802, which is a continuation of Ser. No. 651,048, Sep. 14, 1984, abandoned, which is a continuation of Ser. No. 61,693, Jul. 30, 1979, abandoned. This application Dec. 17, 1985, Ser. No. 810,041
The portion of the term of this patent subsequent to Mar. 25, 2003, has been disclaimed.
Int. Cl.[4] B05B *17/04*; A01G *25/16*; E02B *13/00*
U.S. Cl. 239—1 **4 Claims**



4. An intermittent flow irrigation method for distributing irrigation water relatively evenly along a plurality of furrows divided into a first set of furrows and a second set of furrows, the method comprising the steps of:

advancing irrigation water down the length of the first and second sets of furrows using an on/off cycle comprising the steps of:

supplying a continuous flow of irrigation water into head ends of the first set of furrows during a first predetermined time period such that the irrigation water advances down the length of the first set of furrows;

refraining from supplying irrigation water into the second set of furrows during the first predetermined time period;

supplying a continuous flow of irrigation water into head ends of the second set of furrows during a second predetermined time period such that the irrigation water advances down the length of the second set of furrows; and

refraining from supplying irrigation into the first set of the furrows during the second predetermined time period;

supplying irrigation water to the first and second sets of furrows in a predetermined number of on/off cycles of successively decreasing duration and repeating said on/off cycles in order to supply a predetermined amount of irrigation water to the first and second sets of furrows, each of said on/off cycles comprising the steps of:

supplying a continuous flow of irrigation water into the head ends of the first set of furrows during a third predetermined time period which is shorter than the first predetermined time period;

refraining from supplying irrigation water into the second set of furrows during the third predetermined time period;

supplying a continuous flow of irrigation water into the head ends of the second set of furrows during a fourth predetermined time period which is shorter than the first predetermined time period; and

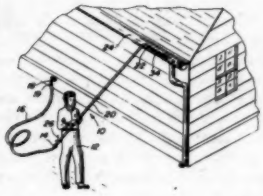
refraining from supplying irrigation water into the first set of furrows during the fourth predetermined time period.

4,673,129

GUTTER CLEANER

George J. Kologiy, c/o T. Beard, 1 Ritz Pl., Lindenhurst, N.Y. 11757

Filed Apr. 3, 1986, Ser. No. 847,770
Int. Cl.[4] B05B *1/32*
U.S. Cl. 239—532 3 Claims



1. A gutter cleaner, comprising:

(a) a housing of tubular form;

(b) a wand of tubular form with an integral short length disposed at a first end of said wand, said wand of a diametrical size to allow insertion into said housing, said wand having an external thread at a second end of said wand;

(c) a garden hose which connects to said external thread of said wand;

(d) a fitting interconnecting said second end of said wand to said garden hose, said tubular housing receiving therein said fitting and straddling it to cover a portion of said wand adjacent said second end and a portion of said garden hose adjacent to the connection to the fitting, whereby said housing provides a handle for use and also protects the connection of the hose and wand, and

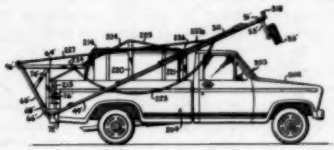
(e) a shut off device, said shut off device affixed proximate the first end of said housing in a slot on the periphery of said housing and coacting with said garden hose, whereby fluid flowing in said garden hose may be shut off by said shut off device.

4,673,130

SPRAY BOOM MOUNTING AND CARRYING SYSTEM

Virgil E. Simpson, Box 41, Ransom, Kans. 67572

Continuation of Ser. No. 578,780, Feb. 9, 1984, abandoned. This application Sep. 8, 1986, Ser. No. 904,825
Int. Cl.[4] B05B *1/20*
U.S. Cl. 239—167 12 Claims



1. Spray apparatus for use on a vehicle adapted to be pulled or driven over the surface of a field to be sprayed,

said spray apparatus adapted to deliver a liquified material along to said substantially parallel, spaced apart, elongate field paths,

each said path oriented substantially normal to the line of motion of the vehicle and

one of said paths positioned on each side of said vehicle,

said vehicle having front and rear, spaced apart ends and opposed, spaced apart, substantially parallel side thereto,

a pair of structural boom support members, each rigidly affixed with respect to an opposite side of the vehicle and positioned behind the rear end thereof,

each said boom support member being mounted with respect to said vehicle in a fixed position lying in a substantially vertical plane substantially paralleling the side of said vehicle and disposed at a rearwardly inclining angle from the vertical of approximately 15 degrees to 35 degrees,

an elongate, normally straight boom having an inner end and an outer end pivotally mounted on each said boom support member close to the lower end thereof and adjacent to the inner end of said boom and adapted to be swung from a first, substantially level, ground paralleling position substantially normal to the longitudinal axis and direction of travel of said vehicle to a second, upwardly angled position along the side of said vehicle substantially paralleling the said side and direction of travel of said vehicle, in a forwardly directed orientation,

the inboard end of each boom being pivotally mounted in one end of a yoke, said yoke fixed at the other ends thereof to a collar rotatably mounted at a fixed level adjacent the lower end of a boom support member,

a frame positioned on said vehicle behind said rear end thereof and rigidly fixed with respect to said vehicle rear end,

said frame including means carrying and supporting said two boom support members in rigid, spaced apart relationship to one another adjacent to said vehicle rear end and

said frame including two normally horizontal, transverse, substantially parallel, vertically spaced apart beam members, said transverse beam members rigidly connecting together and spacing apart the upper and lower ends of the boom support members with respect to one another, said frame also including a pair of substantially horizontal, spaced apart, substantially parallel axial beams, one such axial beam rigidly connected to and extending forwardly from the upper end of each of the boom support members in substantial relationship with the adjacent vehicle side,

said frame also including such additional internal frame structural members as to fix the said boom support members, transverse beam members and axial beams in a rigid, integral structural array at the rear of said vehicle,

two opossed, first rearwardly positioned cable means, one such first rearward cable means resiliently coupling each said boom intermediate the ends thereof by an outboard end of said first rearward cable means with the substantial

midpoint of the upper transverse beam member of said frame by an inboard end of said first rearward cable means,

a resilient spring positioned in each first rearward cable means at the inboard end thereof,

means for limiting the outward resilience of each said spring comprising a cable loop check on the inboard portion of each said first rearward cable means, said loop checks encircling forwardly extending portions of said frame positioned inboard of said boom support memebers, whereby when said booms are moved forwardly for stowage, the first rearward cables will cause the free ends of said booms to rise upwardly, the booms maintained in their upward position by said first rearward cables,

two opposed second, forward cable means, one such second forward cable means coupling each said boom intermediate the ends thereof by an outboard end of said second forward cable means with one of an axial beam member of said frame and a portion of said vehicle itself at a position substantially forwardly, with respect to said frame, of said boom support member upper ends by means of the inboard end of said second forward cable means,

each second, forward cable means being removably connectible to one of the axial horizontal beams at a forward position thereon for lateral beam extension,

means on each side of said vehicle positioned forwardly of the said second, forward cable means connections to said frame for removably engaging an outboard portion of the boom on that vehicle side for supporting same in a stowage, transport position substantially parallel to said vehicle side and extending upwardly at an angle from approximately 15 degrees to 35 degrees from the horizontal, as well as forwardly on said vehicle, and

rotatable wheel means connected to said booms outboard of said first and second cable connections thereto and extending downwardly from said booms substantially normal to the longitudinal axes thereof whereby to support said booms above ground level in substantially horizontal orientation in spraying use.

4,673,131

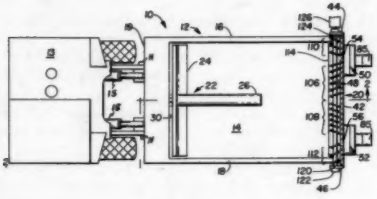
MINE DUSTING MACHINE

Tonny D. Travis, 120 River Rd., Weber City, Va. 24251

Filed Feb. 19, 1985, Ser. No. 703,112

Int. Cl.[4] E01C *19/20*

U.S. Cl. 239—673 **30 Claims**



1. A dusting machine comprising a specialized hopper or scoop bucket having a floor, generally opposite sides and generally opposite front and rear ends and adapted for carrying substantially free-flowing particulate material, the planes of said sides being substantially parallel to maximize the capacity of said hopper, powered ram means on said hopper for pushing said material therein toward said front end thereof, said ram means extending substantially the full width of said hopper, powered conveyor means mounted within said hopper adjacent said front end and substantially parallel thereto for transporting said material toward each of said opposite sides of said hopper, separate multiple flinger means mounted on said front end, at least one said flinger means being provided adjacent each of said opposite sides and adapted to receive said material transported thereto by said conveyor means, each said flinger means having rotatable blade means for dispersing said material with considerable force in a generally arcuate pattern.

4,673,132

SPRAYING APPARATUS

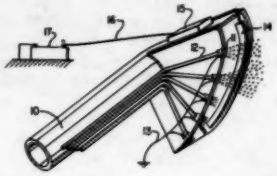
Ion I. Inculet, and George S. P. Castle, both of London, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Continuation of Ser. No. 102,954, Dec. 12, 1979, abandoned. This application Mar. 29, 1982, Ser. No. 363,306

Claims priority, application Canada, Jan. 22, 1979, 320155

Int. Cl.[4] B05B *5/02*

U.S. Cl. 239—706 **2 Claims**



1. Spraying apparatus comprising:

(a) a shroud in the form of a tube flared and flattened at one end to define a generally rectangular, elongated end opening and made of electrical insulating material, said shroud adapted for connection to an air supply such that in operation a high velocity air stream issued from the end opening of the shroud,

(b) a multiplicity of air shear nozzles mounted inside the shroud and arranged in a plane adjacent the end opening,

(c) tube adapted for connection to a liquid spray source for supplying each of the nozzles such that in operation the liquid is atomized by the high velocity air flow passing over the nozzles,

(d) means for maintaining the liquid in said nozzles at ground electrical potential.

(e) high voltage planar electrode means consisting of an elongated flat strip, positioned inside the flared end of the shroud in spaced relation to the nozzles, and

(f) means for supplying high voltage to the electrode means such that in operation the electrode means carries a high voltage positive or negative potential effective to charge by induction liquid particles or droplets issuing from the said nozzles.

4,673,133

PROCESS FOR BENEFICIATING OIL SHALE USING FROTH FLOTATION AND SELECTIVE FLOCCULATION

Rabinder S. Datta, Pittsburgh; Frank F. Aplan, State College, and Charles Zebula, Belle Vernon, all of Pa., assignors to Chevron Research Company, San Francisco, Calif.

Filed Aug. 22, 1985, Ser. No. 768,979

Int. Cl.[4] B02C *19/12*

U.S. Cl. 241—19 **33 Claims**

1. A process for beneficiating oil shale which has been reduced to a size suitable for grinding, comprising the steps of:

(a) grinding said shale in an aqueous medium under conditions, and using a suitable dispersant to a mixture of particles, wherein a substantial proportion of the mineral matter is in substantially kerogen-free particles and a substantial proportion of the kerogen is in generally larger, kerogen-rich particles;

(b) scrubbing the particles in the presence of a suitable dispersant with sufficient turbulence to reduce contaminants on the particles surface and separate adhering kerogen-

poor particles of mineral matter and kerogen-rich particles;

(c) mixing a suitable collecting agent and frothing agent with the scrubbed mixture under conditions suitable to cause a coating of the said collecting agent to be formed on the kerogen-rich particles within the mixture and increasing their hydrophobicity;

(d) introducing air bubbles into the mixture of the said kerogen-rich particles by froth flotation, whereby the air bubbles adhere to the kerogen-rich particles causing them to float as a froth above the mixture containing the kerogen-poor particles;

(e) separating the kerogen-rich froth from the kerogen-poor liquid mixture;

(f) redispersing the kerogen-rich froth;

(g) treating the redispersed mixture with a selective flocculating agent under conditions sufficient to flocculate a second kerogen-rich fraction from the mixture; and

(h) separating said flocculated particles from said mixture.

4,673,134

AGITATING MILL, PARTICULARLY AGITATING BALL MILL

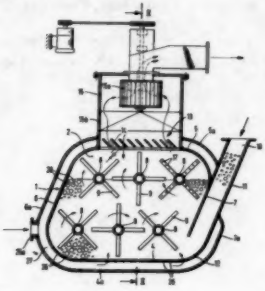
Ulrich Barthelmess, Niederstotzingen, Fed. Rep. of Germany, assignor to Omya GmbH, Cologne, Fed. Rep. of Germany

Filed Nov. 8, 1985, Ser. No. 796,238

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1984, 3440993

Int. Cl.[4] B02C *17/16*

U.S. Cl. 241—57 **9 Claims**



1. An agitating mill, particularly a ball mill, comprising a housing having at least one inlet for material to be ground and for air and an outlet for fines and air, and at least one horizontal agitator shaft which is provided with agitating members, said at least one inlet being parallel to said at least one horizontal agitator shaft and extending substantially throughout the length of said at least one horizontal agitator shaft, and said outlet for fines and air extending substantially throughout the length and width of a top wall of the housing.

4,673,135

FRUIT SHREDDING APPARATUS

Cherles E. Cory, 5215 Vine Hill Rd., Sebastopol, Calif. 95472

Filed Jul. 22, 1985, Ser. No. 757,390

Int. Cl.[4] B02C *18/30, 18/36*

U.S. Cl. 241—82.1 **13 Claims**

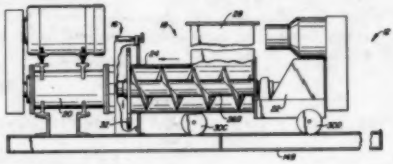
1. A fruit shredding apparatus, comprising

fruit shredding means for shredding fruits, said fruit shredding means comprises

a drive shaft,

fruit shredding motor means rotatably connected to said drive shaft, and

a generally planar cutting disc rotatably mounted to said drive shaft, wherein said cutting disc is configured into a plurality of generally similar zones, and further wherein each of said zones has a plurality of cutting holes for shredding said fruits into a plurality of elongated strings, said cutting holes being arranged into a plurality of rows which occupy approximately one half of each of said zones, with each of said rows within each of said zones containing a number of said cutting holes such that said cutting holes of one of said rows are positioned in a staggered fashion with respect to said cutting holes of an adjacent one of said rows and the number of said cutting holes for each of said rows is different from the number of said cutting holes for said adjacent one of said rows; and



fruit conveying and pressing means for conveying and pressing said fruits toward said fruit shredding means, said fruit conveying and pressing means comprises

two parallel, longitudinally extending helical screws for conveying and pressing said fruits toward said cutting disc, wherein said helical screws are positioned in an intermeshing configuration for projecting a positive pressure on said fruits so as to efficaciously convey and press said fruits toward said cutting disc, and

fruit conveying motor means for driving said helical screws, wherein said fruit conveying motor means is a variable speed conveying motor for maintaining sufficient pressure on said fruits so as to ensure a consistent cutting of said fruits.

4,673,136

APPARATUS FOR THE DRY DEFIBRATION OF SHEETS OF FIBROUS CELLULOSE MATERIAL AND LIKE MATERIALS

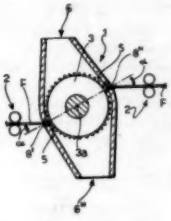
Carlo Bianco; Roberto Colleluori, and Egidio De Sanctis, all of Pescara, Italy, assignors to Fameccanica S.p.A., Sambuceto di San Giovanni T., Italy

Filed Jun. 18, 1985, Ser. No. 746,235

Claims priority, application Italy, Jun. 20, 1984, 67634 A/84

Int. Cl.[4] B02C *19/12*

U.S. Cl. 241—280 **9 Claims**



1. Apparatus for the dry defibration of sheets of fibrous cellulose material, comprising a generally cylindrical rotor, rotatable about its main axis and having teeth on its outer surface for impinging upon the material to be defibrated, and a casing surrounding the rotor into which the sheets to be defibrated are fed wherein:

the rotor comprises a plurality of discs each having an outer toothed edge, said discs being connected together in a

pack in an arrangement in which each disc lies in a plane at a predetermined angle (↑) other than zero to planes perpendicular to the main axis of the rotor, so that during rotation of the rotor, the outer toothed edge of each disc describes a respective substantially cylindrical surface (S') coaxial with said main axis at least marginally mating with similar surfaces (S'', S''') described by the outer toothed edges of the adjacent discs,

each tooth of the rotor has a front flank which is intended to impinge upon the mateiral to be defibrated and which lies substantially in a respective radial plane of the rotor, and

said casing having an aperture located to receive the sheets of material to be defibrated in a feed plane which is at a predetermined angle (a) to said radial plane of the rotor which passes through a region at which the sheets are fed into the casing, said feed plane of the sheets to be defibrated being at an angle of less than 180° to the passing radial plane of the rotor.

4,673,137

METHOD OF AND APPARATUS FOR FORMING A WADDING LAP

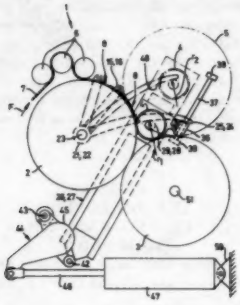
Peter Bächinger, Weinfelden, and Mondini Giancarlo, Winterthur, both of Switzerland, assignors to Maschinenfabrik Rieter AG, Winterthur, Switzerland

Filed Feb. 22, 1985, Ser. No. 704,292

Claims priority, application Switzerland, Mar. 15, 1984, 1299/84

Int. Cl.⁴ B65H *18/20*

U.S. Cl. 242—55.1 **34 Claims**



1. A method of forming a lap from a fibrous web, comprising the steps of advancing the web in a predetermined path to a lap-forming location; forming the lap from the web at said lap-forming location; calendering the web in said path upstream of said lap-forming location; and preparing the web for said forming step in said path after said calendering step and prior to reaching said lap-forming location, including condensing the fibrous material of the web and causing the fibers of the web to assume substantially random dispositions at least at one of the major surfaces of the web with respect to the fibers at the other major surface of the web to such an extent as to avoid entanglement of the fibers of successive convolutions of the lap.

4,673,138

APPARATUS FOR PREVENTING SCATTER OF FLY IN WINDER

Yoshiyuki Ichiba, Kyoto, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

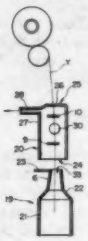
Filed Feb. 26, 1986, Ser. No. 834,191

Claims priority, application Japan, Mar. 1, 1985, 60-41585

Int. Cl.⁴ B65H *54/20, 59/00, 49/00*

U.S. Cl. 242—35.5 R **17 Claims**

1. An apparatus for preventing scatter of fly in a winder having at least one winding unit in which a yarn is unwound from a yarn feeding bobbin and is directed through a tension unit before being taken-up on a take-up package, said apparatus comprising: a first cover member for covering the yarn feeding bobbin unwound at the winding unit; a second cover member



for covering the tension unit; and means for directing a fluid flow through the interior of both said first cover member and said second cover member, whereby fly generated within said first cover member and said second cover member are removed via said fluid flow.

4,673,139

TEXTILE MACHINERY YARN SUPPLY APPARATUS

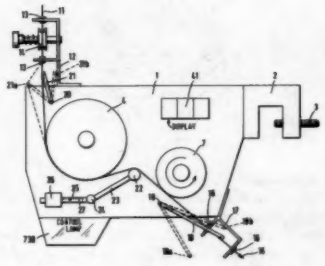
Gustav Memminger, Heideweg 65, D-7290 Freudenstadt, and Erich Roser, Bermatingen, both of Fed. Rep. of Germany, assignors to Gustav Memminger, Freudenstadt, Fed. Rep. of Germany

Filed Jul. 26, 1985, Ser. No. 759,653

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1984, 3429207

Int. Cl.⁴ B65H *51/30;* **D04B** *15/48, 15/50*

U.S. Cl. 242—47.01 **20 Claims**



1. Yarn supply apparatus for a knitting feed of a knitting machine having a rotatable yarn supply disk or drum (4) supplying yarn having yarn looped thereabout and supplying yarn under slip-free conditions,

a speed-controllable drive motor (6) coupled to operate the yarn supply disk or drum (4) in a slip-free manner; and

yarn pull-off speed sensing means (7, 9) coupled to the yarn being removed from the yarn supply disk or drum (4) by the knitting feed under slip-free conditions, at a yarn pull-off speed determined by said knitting feed,

said yarn speed sensing means (7, 9) sensing speed of the yarn being removed by said knitting feed and providing a yarn speed supply signal,

wherein, in accordance with the invention,

the rotatable yarn supply disk or drum (4) supplies the yarn under slip-free conditions and at a predetermined tension;

the yarn speed sensing means (7, 9) are located, viewed in

the direction of travel of the yarn being supplied, between the yarn supply disk or drum (4) and the knitting feed; and

means (30, 31) for coupling the yarn speed supply signal to the speed controllable drive motor (6) and for controlling the speed of operation of the speed controllable drive motor in accordance with the yarn speed supply signal, and hence in accordance with the speed of the yarn being removed from the yarn supply disk or drum (4) by the knitting feed; and

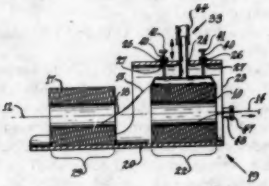
wherein the yarn (11), the yarn pull-off speed sensing means (7, 9), the drive motor (6) and the yarn supply disk or drum (4) coupled thereto form a closed control loop.

4,673,140

METHOD AND APPARATUS FOR FACILITATING THE WITHDRAWAL OF STRAND FROM WOUND PACKAGES

David M. Boles, Anderson, S.C., assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Sep. 18, 1986, Ser. No. 908,844
Int. Cl.[4] B65H *49/02*
U.S. Cl. 242—54 R **11 Claims**



1. Apparatus of holding a package of strand helically wound about an axis so that the strand can be unwound, from the interior thereof, said package having an arcuate periphery, comprising;

base member adapted to support at least one package of strand; and

manifold means movable with respect to the base member and biasable against a portion of the arcuate periphery of the package, the manifold having an apertured section at the region of contact with the package, the manifold being adapted to be connected to a source of vacuum to cause the outer periphery of the package to be drawn against the apertured section of the manifold during withdrawl of the strand from the package to retain the strands at the periphery of the package of facilitate the complete withdrawal of the strand from the package.

4,673,141

FEED CONTROL APPARATUS

Ali T. Mazumder, and Brian M. Fairey, both of Waterloo, Canada, assignors to NCR Corporation, Dayton, Ohio

Filed Sep. 12, 1985, Ser. No. 775,078
Int. Cl.[4] B65H *23/08*
U.S. Cl. 242—75.47 **20 Claims**

1. Ribbon feed control apparatus comprising:

apparatus support means;

ribbon supply means on which a supply of ribbon may be placed, said ribbon supply means being rotatably mounted on said apparatus support means;

ribbon take-up means rotatably mounted on said apparatus support means;

drive means for driving said ribbon take-up means;

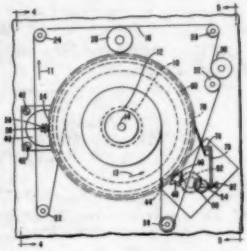
guide means for guiding ribbon from said ribbon supply means to said ribbon take-up means;

brake means for applying variable braking force to said ribbon supply means;

lever means pivotally mounted on said apparatus support means, having said brake means adjacent one end thereof and having cam following means adjacent the other end thereof;

cam means rotatably mounted on said apparatus support means in operative engagement with said cam following means for causing movement of said lever means as said cam means is rotated from an initial position to a final position;

cam operating means driven by engagement with said ribbon supply means to incrementally move said cam means for each complete revolution of said ribbon supply means for



altering the force with which the brake means is applied to the ribbon supply means, varying from a relatively large force when the ribbon supply means contains a full supply of ribbon, to a relatively small force when said ribbon supply has been exhausted; and

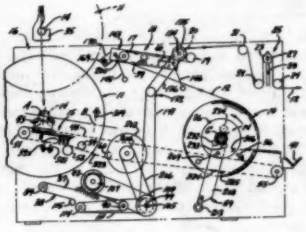
reset means for resetting said cam means from said final position to said initial position, after said ribbon supply has been exhausted, in preparation for replacement and dispensing of the next supply of ribbon from said ribbon supply means.

4,673,142

APPARATUS FOR CONTINUOUSLY SUPPLYING A WEB OF SHEET MATERIAL

John F. Keene; Bengt L. Kuller, and Robert G. Kemmeter, all of Rockford, Ill., assignors to Enkel Corporation, Rockford, Ill.

Division of Ser. No. 799,477, Nov. 19, 1985, Pat. No. 4,614,313, which is a division of Ser. No. 555,823, Nov. 28, 1983, Pat. No. 4,564,150. This application Jun. 16, 1986, Ser. No. 874,412
Int. Cl.[4] B65H *19/12, 19/18*
U.S. Cl. 242—58.3 **1 Claim**



1. In an apparatus for continuously supplying a web of sheet material wound as a roll on a core, the combination of, a base, a carrier mounted on said base, a car supported on said carrier for bodily movement therewith through first, second and third stations and adapted to receive a core of a roll, said car receiving and supporting the core of a roll when the car is at said first station to carry the roll to said second station and then to said third station, said car supporting the roll for rotation about the axis of the core, a journal disposed adjacent said third station, means for raising said journal to lift the core of a first roll from

said car and support the core and the roll for rotation with the core above the car whereby said carrier may return the car to said first station to receive the core of a second roll and thereafter advance said second roll to said second station, means for guiding the web from said first roll, splicing mechanism operable when actuated to attach the web from said first roll to the web on said second roll and thereafter sever the combined web from the first roll, means for discharging an exhausted roll from said journal, and control means operable sequentially to operate said splicing mechanism and attach the web from said first roll to the web on said second roll, to discharge said first roll from said journal, to lower the journal, to advance said a carrier to move said car and said second roll from said second station to said third station and raise said journal to lift the second roll from said car.

4,673,143

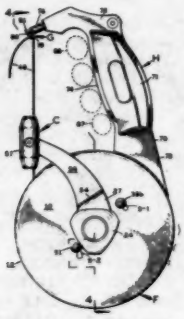
HAND-HELD FISHING REEL

Franklin S. Intengan, 17831 SW. 79th Pl., Palm Springs North, Fla. 33015

Continuation-in-part of Ser. No. 673,582, Nov. 21, 1984, abandoned. This application Jan. 27, 1986, Ser. No. 822,382

Int. Cl.[4] **B65H** *75/40*; **A01K** *89/015*

U.S. Cl. 242—96 **4 Claims**



3. In a hand-held fishing reel having:

a rigid support frame;

a fishing line spool rotatably mounted on said frame;

and a manual crank operatively coupled to said spool for rotating the latter;

the improvement which comprises:

a handle rigidly connected to said frame and presenting opposite first and second longitudinal edges each extending outward from a rotational axis of the spool, the edges of said handle lying generally in a plane perpendicular to said axis, said handle being long enough to be grasped by one hand of the user above said frame with all the fingers of the hand extending across said first longitudinal edge while the palm of the hand engages said second longitudinal edge of the handle;

a line guide element for slidably passing a fishing line wound on the spool;

and means supporting said line guide element from said handle spaced outward from the spool and extending past said first longitudinal edge of the handle in a direction away from said second longitudinal edge and generally transverse to the rotational axis of the spool in a position to pass the line without interference with the user's hand grasping the handle with the fingers extending across said first longitudinal edge and the palm of the hand engaging said second longitudinal edge but close enough to the handle to enable the user to engage the line by extending the index finger of said hand from said first longitudinal edge of the handle.

4,673,144

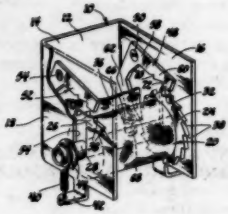
SEAT BELT RETRACTOR

Trevor K. Byford, Essex, England, assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 3, 1986, Ser. No. 847,762

Int. Cl.[4] **A62B** *35/00*; **G05G** *1/00*

U.S. Cl. 242—107.4 C **3 Claims**



3. A seat belt retractor comprising:

a frame having spaced apart walls;

a reel having a toothed sprocket and reel shaft with a belt wound therearound;

elongated aperture means provided in the spaced apart walls and receiving the reel shaft to mount the reel on the frame to permit reel rotation about an axis to wind and unwind the belt and to permit bodily shifting movement of the reel by a predetermined load imposed on the belt;

spring means acting between the reel shaft and the frame to urge the reel shaft to a normal position at an end of the elongated aperture means furthest from the direction of belt payout from the retractor;

a locking pawl pivotally mounted on the frame and adapted to engage with the sprocket, said locking pawl having a base portion pivotally mounted on the wall and first and second legs extending angularly outwardly from the base portion;

means acting to normally position the pawl at a rest position in which the legs thereof are spaced away from the toothed sprockets in straddling relationship therewith;

whereby the imposition of a predetermined load on the belt bodily shifts the reel as permitted by yielding of the spring means, and travel of the reel shaft along the elongated aperture means carries the sprocket into engagement with at least one of the pawl legs to stop the unwinding rotation of the reel and then effect pivotal movement of the pawl upon further bodily shifting movement of the reel to engage the other leg of the pawl with the toothed sprocket whereby the reel is locked against unwinding rotation by pawl engagement with the toothed sprocket on opposite sides of the axis of reel rotation.

4,673,145

CASSETTE HOLDER IN RECORDING AND REPRODUCING APPARATUS FOR MAGNETIC TAPE CASSETTE HAVING UNDERSIDE-COVERING SLIDING SHUTTER MEMBER

Masashi Emori, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jan. 17, 1986, Ser. No. 819,827

Claims priority, application Japan, Jan. 23, 1985, 60-10446

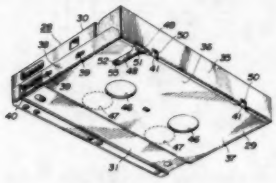
Int. Cl.[4] **G11B** *23/04*

U.S. Cl. 242—198 **64 Claims**

1. A cassette holder in a recording and reproducing apparatus for a magnetic tape cassette comprising a cassette casing having a mouth through which a magnetic tape is accessible, said mouth including a first opening in a front end face of said casing and a second opening in a lower section of the casing adjacent said front end face, a pair of tape reels around which said magnetic tape is wound, a pivotal lid covering and exposing said first opening of said mouth, a sliding shutter member

slidable with respect to the lower section of said cassette casing and adapted to cover and expose said second opening in said lower section, said shutter member being movable between a first position in which it covers said second opening and a second position in which it exposes said second opening, and a locking means for normally holding said shutter member in both of said first and second positions and allowing said shutter member to move from said first position to said second position when said cassette is inserted into an associated recording and reproducing apparatus, and from said second position to said first position when said cassette is ejected said cassette holder comprising:

a holder body defining a cassette reception space and having a floor on which said cassette is mounted; and



means, incorporated in said holder body and cooperatively associated with said locking means, for unlocking said locking means, said unlocking means having a first component active at said first position of said shutter member to allow movement of said shutter member from said first position to said second position when said magnetic tape cassette is inserted into said cassette reception space, and a second component active for unlocking siad locking means at said second position of said shutter member for allowing movement of said shutter member from said second position to said first position when said magnetic tape cassette is ejected from said recording and reproducing apparatus.

4,673,146

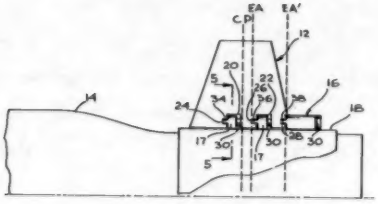
MISSILE TAIL FIN ASSEMBLY

Ronald T. Inglis, Laguna Beach, Calif., assignor to General Dynamics, Pomona Division, Pomona, Calif.

Division of Ser. No. 523,472, Aug. 15, 1983, Pat. No. 4,588,145. This application Apr. 8, 1985, Ser. No. 721,056

Int. Cl.[4] F42B *15/047*

U.S. Cl. 244—3.23 **7 Claims**



1. The method of compensating for roll rate decay from a predetermined roll rate of a missile having a plurality of tail fins for establishing said predetermined roll rate in flight, each tail fin being mounted to the missile on a pivot axis by at least two longitudinally displaced locking mechanisms that are located respectively forward and rearward of the center of pressure of the fin, each locking mechanism including a plurality of teeth and mating slots limiting the pivotal movement of an associated portion of the fin, the decay of said predetermined roll rate resulting from missile flight at increased angles of attack, comprising the steps of:

permitting only a portion of a tail fin to pivot about said axis when in flight while preventing the remainder of the tail fin from pivoting, thereby introducing a change of fin orientation to develop said roll rate compensation.

4,673,147

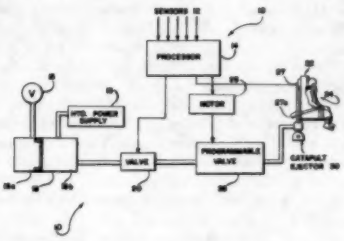
PROGRAMMABLE EJECTION SEAT SYSTEM

Byron C. Solomonides, Columbus, Ohio, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Feb. 21, 1985, Ser. No. 703,974

Int. Cl.[4] B64D *25/10*

U.S. Cl. 244—122 A **27 Claims**



1. A system for ejecting a crewmember from an aircraft comprising:

an ejection seat for the crewmember;

sensing means for sensing selected parameters that may affect ejection of the crewmember;

processing means responsive to said sensing means for computing and generating a force signal, said force signal being a variable which is computed as a function of said sensed parameters, said force signal corresponding to an ejection force profile for said ejection seat which is within human safety tolerances for the crew member at the time of initiation of ejection; and catapult

ejector means for ejecting said ejection seat from the aircraft, said ejector means generating an ejection force with a variable magnitude being responsive to said force signal such that ejection of said ejection seat is in a specialized manner based upon the nature of said force signal.

4,673,148

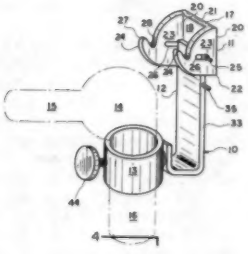
HOLDER FOR A HAIR DRYER

James A. Oliver, 101 Federal St., Sandston, Va. 23150

Filed Jun. 2, 1986, Ser. No. 870,770

Int. Cl.[4] E04G *3/00*

U.S. Cl. 248—293 **4 Claims**



1. A holder for an electric hair dryer having an elongated barrel, said holder comprising:

(a) a bracket comprised of a base panel intended to be vertically disposed and having front and rear surfaces, paired

side panels emerging perpendicularly from the front surface of said base panel in parallel relationship and terminating in forward extremities, a horizontally elongated slot having a straight bottom disposed in each panel in substantially parallel orientation, and an upwardly opening hook portion disposed within the forward extremity of each side panel, said hook portions having a rounded bottom tangentially aligned with the bottom of said slots,

(b) an elongated rigid arm having a proximal extremity, a distal extremity, upper, lower and side surfaces, and first and second pairs of pivot studs perpendicularly emergent from each side surface adjacent said proximal extremity, said first studs penetratively and slideably engaging the slots in said side panels, and said second studs being configured to fit within said hook portions when said first studs are at the rearwardmost extremities of said slots,

(c) a circular cylindrical band defined by a rigid sidewall pivotably affixed to the distal extremity of said arm and configured to rotate in a path above the upper surface of the arm and parallel to the axis of elongation thereof, and

(d) threaded locking means which radially penetrate the sidewall of said band and manually operable from the exterior of said sidewall, whereby

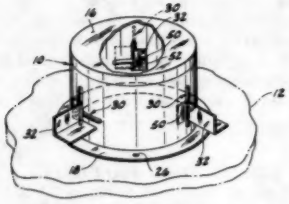
(e) a hair dryer can be held by the insertion of the barrel of the dryer into said band, and

(f) said arm can be swung in a vertical path between pendant vertical and horizontally locked positions.

4,673,149
LOUDSPEAKER MOUNTING SYSTEM

Warren Grote, Florissant, and Frederick R. Leu, St. Charles, both of Mo., assignors to American Trading and Production Corporation, Baltimore, Md.

Filed Apr. 7, 1986, Ser. No. 848,710
Int. Cl.[4] B42F *13/00*
U.S. Cl. 248—343 **6 Claims**



1. A recessed fixture enclosure for a ceiling having an upper side and an underside, the enclosure comprising:

(a) an upper wall,

(b) flange means disposed in spaced relation from the upper wall and operatively engageable with the underside of the ceiling,

(c) a peripheral sidewall extending between the upper wall and the flange means, said sidewall including a plurality of peripherally spaced slots each having a relatively narrow generally vertical leg,

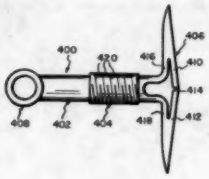
(d) a plurality of individual support bracket members each including a forward portion extendable outwardly of the sidewall and having a relatively narrow vertical leg, receivable by an associated sidewall slot vertical leg in guided relation, and a bearing portion operatively engageable with the upper side of the ceiling, and a transverse rearward portion operatively engageable with the inside face of the sidewall and having a generally vertical slot, and

(e) a plurality of inwardly extending fastener means each attached to the sidewall adjacent an associated sidewall slot and received by the bracket member rearward portion slot for adjusting the location of the bracket member bearing portion.

4,673,150
PLASTIC FASTENERS

Thomas W. McSherry, Stamford, Conn., and Nathaniel H. Garfield, Harrison, N.Y., assignors to Mechanical Plastics Corp., Pleasantville, N.Y.

Filed Oct. 22, 1984, Ser. No. 663,613
Int. Cl.[4] F16L *3/08*
U.S. Cl. 248—73 **37 Claims**



1. A one piece integrally molded plastic anchor comprising:

(a) a base member having a channel portion;

(b) elongated extension means integrally connected to a first side of said base member for supporting and attaching an object thereto; and

(c) expansible locking means integrally connected to a second side of said base member and having a collapsed position for insertion through an opening defined by a structural member and an overcenter expanded position to lock said anchor within said opening, with said locking means comprising:

(i) a pair of connecting arms integrally connected to said second side of said base member and extending outwardly away therefrom;

(ii) a pair of toggle arms connected to lateral ends of said connecting arms and extending inwardly therefrom; and

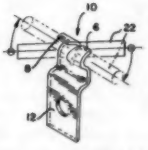
(iii) means connecting the inward ends of said toggle arms together for pivotal movement between said collapsed and expanded positions and wherein, in said expanded position, said toggle arms are in said overcenter position with said fastener being thereby securely locked to said structural member;

said base member also defining an open pathway to receive means for pushing said locking means into said expanded position.

4,673,151
TWIST CLIP

Edward C. Pelz, Grabill, Ind., assignor to Navistar International Corporation, Chicago, Ill.

Filed Aug. 30, 1985, Ser. No. 771,447
Int. Cl.[4] F16L *3/08*
U.S. Cl. 248—74.1 **12 Claims**



1. A clip for retaining an axially elongated object on a structural number comprising:

a body for attachment to said structural member;

a first finger projecting from said body for partially surrounding and sphincterally engaging said elongated object in a first substantially radial plane with respect to said elongated object, said first finger being open in a first direction;

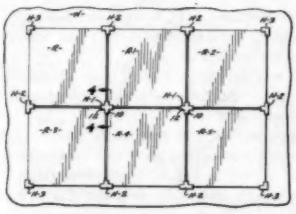
a second finger projecting from said body for partially surrounding and sphincterally engaging said elongated object in a second substantially radial plane with respect to said elongated object, said second finger being open in a direction opposite said first direction, said second finger being spaced from said first finger and forming a gap therebetween, the width of said gap being substantially the same as the width of said elongated object to closely receive said elongated object, said gap being disposed at an acute angle between 35° and 50° to said planes and being circumferentially oriented relative to said fingers to permit said elongated object to be rotated from within said gap to a position perpendicular to said first and second radial planes.

4,673,152

RECORD ALBUM DISPLAY AND SUPPORT SYSTEM

Paul A. Brown, Box 37 Surfside Colony, Surfside, Calif. 90743

Filed Mar. 10, 1986, Ser. No. 837,803
Int. Cl.⁴ E04G *3/00*
U.S. Cl. 248—216.1 **6 Claims**



1. A wall-mounted record album display and support system including at least four hanger members, each hanger member comprising:

vertical and horizontal leg means that are normal to one another and have coinciding centers;

a spacer rib extending rearwardly from the center of said legs into abutment with the wall, said spacer rib having a height slightly greater than the depth of a record album to be displayed to define a record album receiving space;

a nail secured to the hanger member to secure it to the wall; and

with the four hanger members being positioned on the wall at points generally corresponding to the corners of a record album, said record album corners being removably inserted within said space.

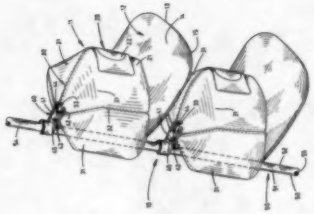
4,673,153

CLOTHING SUSPENSION APPARATUS

Calvin A. Hilty, 16985 Ave. 192, Strathmore, Calif. 93267, and Larry J. Raid, Denmark, Iowa 52624

Filed Apr. 7, 1986, Ser. No. 849,121
Int. Cl.⁴ A47B *96/06*
U.S. Cl. 248—231.8 **1 Claim**

1. A cap suspension apparatus for supporting and displaying a cap having a front portion and additionally having a button affixed on a crown thereof by an interconnection, the apparatus comprising a tubular support member adapted to be disposed in a substantially vertical attitude; and at least one button engagement assembly having an attachment member and a pair of dependent legs, said attachment member being dimensioned slidably to engage and by the effect of friction hold in mating relation the engagement assembly on said support member, and the dependent legs having edge-like internal surfaces defining an inwardly convergent slot communicating with an annular bore and said legs dimensioned to be slidably moved between the button and the crown of the cap and on opposite sides of



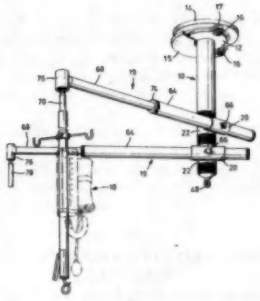
the interconnection between the button and crown and into supporting relation to the cap for retaining the cap in supported relation on the support member for displaying said front portion thereof.

4,673,154

SUSPENSION DEVICE

Alexander D. Karapita, 38 Robinter Drive, Willowdale, Ontario, Canada M2M 3R2

Filed Jul. 5, 1983, Ser. No. 510,643
Int. Cl.⁴ A47H *1/10*
U.S. Cl. 248—320 **11 Claims**



1. A device from which articles can be suspended comprising:

a suspension post;

a first rotor;

a first bearing having a shaft with two ends and a race rotatable about the shaft;

one end of said shaft of said first bearing being rigidly mounted with respect to said suspension post;

said rotor being carried by said race of said first bearing for rotation about the axis of the shaft of said first bearing;

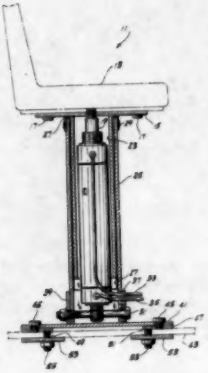
a first bearing coupler rigidly mounted with respect to said shaft of said first bearing and adapted to receive in rigid coupling relation one end of the shaft of a second bearing that is similar to said first bearing;

an article support arm assembly carried by said rotor.

4,673,155
VERTICALLY ADJUSTABLE BOAT FURNITURE

William T. Binder, 7757 Clayton Rd., St. Louis, Mo. 63117

Filed Apr. 18, 1986, Ser. No. 853,632
Int. Cl.[4] F16M *11/00*
U.S. Cl. 248—404 6 Claims



1. Vertically adjustable boat furniture such as a chair, a table, or the like comprising:

a base securely mountable to the deck of a boat and fixed aginst rotation with respect thereto;

a first hollow shaft of generally square cross section fixedly secured to the base and extending upwardly therefrom, said first shaft being irrotatable with respect to the base;

a second hollow shaft of generally square cross section longitudinally movable with respect to the first shaft, said shafts being coaxial, one of said shafts being disposed at least partially inside the other, the spacing of the shafts being sufficiently small that the shafts cannot rotate with respect to each other;

a fluid operated piston operably secured to the second shaft for moving it longitudinally with respect to the first shaft;

a mounting surface disposed at the top of the second shaft and fixedly secured thereto;

a seat, table top, or the like secured to the mounting surface; and

manually controllable means for operating the piston to move the mounting surface to a desired height, whereby the seat, table top, or the like is readily positioned at a desired height with respect to the deck of the boat.

4,673,156
LIQUID-FILLED TYPE VIBRATION DAMPING STRUCTURE

Toshiyuki Tabata, Sagamihara, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Oct. 16, 1985, Ser. No. 788,139
Claims priority, application Japan, Oct. 16, 1984, 59-216842
Int. Cl.[4] F16M *5/00*
U.S. Cl. 248—559 5 Claims

1. A liquid-filled type vibration damping structure comprising:

a liquid-filled vibration isolator having

(a) first and second frames respectively mounted on a vibration source and on the side of a vehicle body;

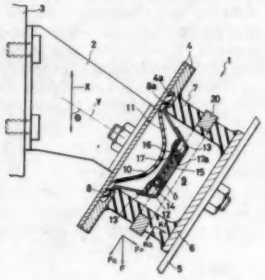
(b) a resilient member connected between said first and second frames;

(c) a diaphragm secured to the first frame;

(d) a baffle member secured onto the first frame and dividing an internal space surrounded by said resilient member, said diaphragm, and the second frame into first and second liquid chambers, said baffle member further having a hole and a first aperture for communicating said first and second liquid chambers with each other;

(e) a holder cooperating with the baffle member to form therebetween an orifice portion communicated with the hole of the baffle member and having at least one aperture aligned with the first aperture of the baffle member;

(f) a movable plate held by at least the holder between the apertures of the holder and the baffle member and moved with respect to the baffle member by the liquid flow through the apertures of the holder and the baffle member, each aperture of the holder and the baffle member having a predetermined diameter smaller than the diameter of the movable plate; and



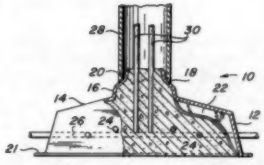
(g) at least one mass body attached into the resilient member to reduce the resilient coefficient thereof, said structure further comprising:

a bracket member for mounting said vibration isolator onto said vibration source at a predetermined angle of inclination with respect to the direction of vibration from said vibration source, said angle being sufficient to suppress the generation of a liquid column resonance peak.

4,673,157
FOOTING FORM

Gordon T. Wells, 27 School St., Northfield, Vt. 05663

Filed Nov. 13, 1985, Ser. No. 797,502
Int. Cl.[4] E02D *5/66*
U.S. Cl. 249—13 2 Claims



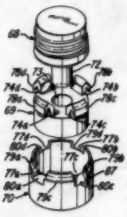
1. A one piece hollow footing mold for use in conjunction with a one piece pier mold for simultaneous pouring of unitary concrete footings and piers and which footing mold remains part of the finished footing, comprising:

an open top hollow molded shell having a rectangular flat base and side walls which are step tapered and terminate at their upper ends in a pair of step tapered sections, the uppermost of said sections has a smaller cross-section than the other section, both sections being sized to receive different sized hollow concrete pier forms, said uppermost section being removable in the field, said shell further having integral reinforcing ribs extending inwardly from opposite sides of the shell.

4,673,158
APPARATUS FOR FORMING A PILFER PROOF CONTAINER CLOSURE

Charles N. Hannon, Scarsdale, and Leonard J. Vallender, Valhalla, both of N.Y., assignors to Charles N. Hannon, Scarsdale, N.Y.

Division of Ser. No. 679,706, Dec. 10, 1984, Pat. No. 4,592,475, which is a continuation-in-part of Ser. No. 447,284, Dec. 6, 1982, abandoned. This application Nov. 27, 1985, Ser. No. 802,235
Int. Cl.[4] B29C *45/26, 45/44*
U.S. Cl. 249—144 7 Claims

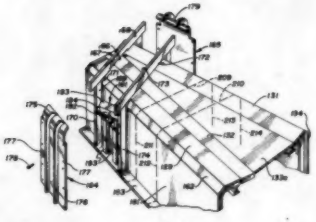


1. A mold for making a plastic closure having a pilfer-proof ring and hooks extending from one axial end of the ring in a direction inwardly and toward the other end of the ring, each of the hooks comprising a generally outwardly facing surface juxtaposed to a corresponding part of the inwardly facing surface of the ring, the mold comprising a female mold and core defining a mold cavity therebetween and rotatable means to define juxtaposed surfaces of the ring and the hooks, whereby the rotatable means can be rotated out of the way after the closure has been molded, whereby the closure can be removed from the mold.

4,673,159
MOLDING FORMS FOR MAKING PRECAST PORTAL ASSEMBLY SECTIONS FOR CULVERTS

Eugene D. Schmidgall, Hancock, Minn., assignor to Hancock Concrete Products Co., Inc., Hancock, Minn.

Filed Oct. 18, 1984, Ser. No. 662,260
Int. Cl.[4] B28B *7/30*
U.S. Cl. 249—159 10 Claims



1. A molding form for selectively precasting sections for a portal assembly to be connected at one end of a box culvert of the type which provides a bottom wall, side walls and a top wall for a generally crosswise stream passage under an embankment which extends along a longitudinal axis and which has a laterally outwardly and downwardly inclined fill slope defining a fill slope plane at a desired vertical fill slope angle as measured in a vertical plane perpendicular to such longitudinal embankment axis, and in which each such section, when installed at said one box culvert end, has a precast U-shaped body portion in which the base of such U provides a bottom wall surface for the desired stream passage and the arms of such U extend upwardly from said base and provide side walls at each side of said stream passage, said molding form comprising:

an inner form member having respective upwardly-facing and oppositely outwardly-facing top and side wall mold surfaces corresponding respectively to upside-down images of the inner bottom wall and opposite inner side wall surfaces of at least one such desired U-shaped body portion, for precasting such a body portion as a monolithic unit in upside-down position above the top mold wall surface and down along the opposite side mold wall surfaces of said inner form member;

at least two outer side wall form members supported in respective positions extending along and spaced outwardly from the opposite outwardly-facing mold wall surfaces of the inner form member and having inwardly-facing side wall mold surfaces corresponding to upside-down images of the outer side wall surfaces of the desired U-shaped body portion;

at least two bottom form members having upwardly-facing top wall mold surfaces extending along and closing lower portions of the molding form between the inner and outer form members at the respective opposite sides of said inner form, and corresponding to upside-down images of the upper edges of the side walls of the desired U-shaped body portion; and

at least two end wall form members for selective assembly across said upwardly-facing top mold wall surface and vertically down across the space between said outwardly-facing side wall surfaces of said inner form member and said inwardly-facing side mold wall surfaces of the outer side wall form members, said end form members having respective end wall mold surfaces corresponding to upside-down images of the opposite inner and outer end faces of such desired U-shaped body portion;

the upper portion of the molding form above the upwardly-facing top mold wall surface of the inner form member and between the mold wall surfaces of the respective outer side wall form members and the end wall form members providing an upwardly open end area through which a concrete mix can be fed downwardly between the inner and outer side mold wall sufaces and across the top mold wall surface of the inner form member, where the top portion of the mix can be finished off to a depth and shape corresponding to an upside-down image of the desired outer bottom surface of the desired U-shaped body portion,

the upwardly-facing top wall mold surfaces of said bottom form members corresponding respectively to upside-down images of the edge surfaces of the desired U-shaped body portion side walls and extending longitudinally of the mold form at vertical distances below the upwardly-facing top wall mold surface and at vertical angles corresponding to the upside-down images of the desired vertical heights and slopes of the respective U-shaped body portion side wall upper edges above the inner bottom wall surface of such body portion,

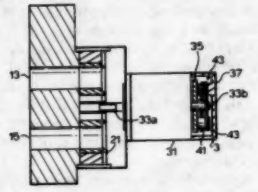
the upwardly-facing top mold wall surface of the inner form member comprising at least one selectively insertable and removable insert section for changing one of the effective shape and width characteristics of the top mold wall surface of the inner form member corresponding to an upside-down image of one of the desired shape and width characteristics of the desired U-shaped body portion to be cast in inverted position thereon,

the oppositely outwardly-facing side mold wall surfaces of the inner form member having individual supporting means for selectively supporting them in first relative positions parallel to each other and perpendicular to a vertical plane at one end of the inner form member, and in a selected one of a plurality of alternate relative positions in which the side mold wall surfaces are oriented in vertical planes which diverge from each other from said one end of the inner form member toward the other end of said form.

4,673,160
DIGITAL SERVO-VALVE

Patrick Tolley, Downsview, Canada, assignor to Hydracine Fluid Power Limited, Downsview, Canada

Filed Mar. 19, 1986, Ser. No. 841,541
Claims priority, application Canada, Nov. 14, 1985, 495293
Int. Cl.[4] F16K *31/04*
U.S. Cl. 251—129.05 1 Claim



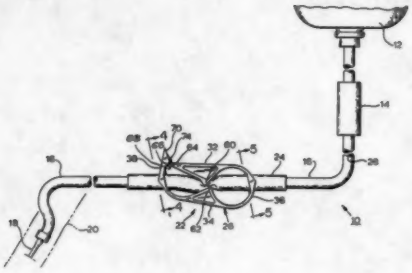
1. A rotary valve comprising: (a) a valve body; (b) a pluraltiy of fluid conduits passing through the valve body comprising supply ports and service ports, each port presenting an orifice to one plane of the valve body; (c) a rotatable valve plate for directing multiple flow paths from the plurality of supply ports to the plurality of service ports, the valve plate having a plurality of fluid channels abutting the one plane of the valve body for rotational alignment of the fluid channels with the supply ports and service ports; (d) a stepper motor having an output shaft mechanically coupled to the valve plate, the output shaft rotatable to rotate the valve plate through a range of predetermined positions; (e) mechanical centering means for returning the valve plate to a predetermined closed position whenever the power is turned off or lost to the stepper motor, and (f) machine intelligence means for controlling the operation of the stepper motor linked to the valve plate, the machine intelligence means including means for registering the position of the valve plate when mechanically returned to a predetermined closed position, determining the required number of electrical pulses at the desired frequency sufficient to activate the stepper motor for a predetermined number of degrees of rotation of the output shaft to advance or return (in clockwise or counterclockwise rotation) the valve plate to a desired position, whereby the stepping motor will advance and stop the valve plate at the desired position without feedback sensors to constantly measure the actual position of the valve plate.

4,673,161
TUBE CLAMPING DEVICE

Daniel P. Flynn, St. Louis, and Alan B. Ranford, Creve Coeur, both of Mo., assignors to Sherwood Medical Company, St. Louis, Mo.

Division of Ser. No. 716,307, Mar. 27, 1985, Pat. No. 4,588,160. This application Apr. 2, 1986, Ser. No. 847,335
Int. Cl.[4] F16L *55/14*
U.S. Cl. 251—10 9 Claims

1. A tube clamping device comprising a body including first and second arms having free ends adjacent each other and having inner and outer sides, an end portion connecting said arms together and resiliently biasing said free ends apart, each of said arms having abutment means on the inner side thereof intermediate said end portion and the free end thereof for clamping tube means between said abutment means, said second arm having a first portion extending generally parallel with said first arm and an integral second portion extending generally normal to said first portion between said first portion and the free end thereof, the inner side of said second portion facing said end portion, the second portion of said second arm having a notch disposed on the inner side thereof so that the free end of said first arm is movable into said notch for latching the free ends of said arms together, first and second cooperable arm alignment maintaining means respectively disposed on said arms for limiting movement of each of said arms in both lateral directions relative to the other of said arms when said arms are latched together, said first alignment means including laterally spaced walls on one of said arms adjacent the free end thereof, said second alignment means including a portion of the other of said arms adjacent the free end thereof movable into the space between said spaced walls for limiting said relative lateral movement, a first slot extending inwardly from a side edge of said body adjacent one end thereof to allow a portion of tube means to enter said first slot sidewall first, and a second

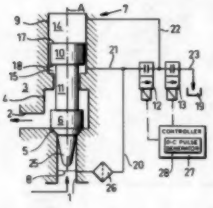


slot spaced from said first slot extending inwardly from a side edge of said body to allow another portion of the tube means to enter said second slot sidewall first, said slots and said abutment means being located so that when the tube means portions are in said first and second slots the tube means extends between said abutment means, and a flexible protective sleeve adapted to substantially surround a portion of said tube means and adapted for insertion with the tube means into said slots whereby said abutment means is engageable with said sleeve.

4,673,162
HIGH-PRESSURE SELF-ACTUATING FLOW-CONTROL VALVE ASSEMBLY

Helmut Lachmann, Margrefstr. 40, 43 Essen 16, Fed. Rep. of Germany

Continuation of Ser. No. 536,892, Sep. 28, 1983, abandoned. This application Jan. 8, 1986, Ser. No. 817,161
Claims priority, application Fed. Rep. of Germany, Sep. 28, 1982, 3235778; Dec. 17, 1982, 3246738
Int. Cl.[4] F16K *31/12*
U.S. Cl. 251—30.01 4 Claims



1. A valve assembly for controlling the flow of water, the assembly comprising:

a housing formed with

a valve chamber and a separate control chamber,

an inlet port and an outlet port both opening into the valve chamber, the inlet port normally being pressurized at high pressure by the water whose flow is being controlled by the assembly, and

a valve seat at the inlet port;

a valve body in the valve chamber displaceable between a closed end position engaging the seat and blocking flow of

the water between the ports and an open end position clear of the seat and permitting flow between the ports through the valve chamber, the valve body having a downwardly tapered end projecting downward at least partially into the inlet port, the valve body defining in intermediate positions between the closed position and the open position the flow cross section of upward flow of water through the inlet port, the valve body having a valve face exposed downward to the pressure of the flow of water;

a control body in the control chamber, the control body formed with a control face and a counterpressure face directed away from the control face, one of the faces being directed away from the control face, one face being of greater effective surface area than the valve face, the control body subdividing the control chamber into a control compartment at the control face and a counterpressure compartment at the counterpressure face, one of the compartments being between the other of the compartments and the valve chamber;

link means interconnecting the control and valve bodies for joint movement for increasing the volume of the one compartment while decreasing that of the other compartment as the valve body moves from the open to the closed position and for decreasing the volume of the one compartment while increasing that of the other compartment as the valve body moves from the closed to the open position;

a sump at substantially lower pressure than the inlet port;

a control flow line connecting the control and counterpressure compartments;

a counterpressure flow line connecting the counterpressure compartment and the sump;

a solenoid-type control valve in the control flow line and openable to permit flow through the respective flow line and closable to block flow through the control flow line;

a solenoid-type drain valve in the counterpressure flow line and openable to permit flow through the respective flow line and closable to block flow through the counterpressure flow line;

conduit means extending from the inlet port to the control compartment for continuously pressurizing the control compartment with the pressure of the inlet port; and

control means including means for generating pulsating direct-current voltage and feeding the pulsating voltage to the control and drain valves for,

in a first valve-body holding position, closing both the control and drain valves and thereby isolating the counterpressure compartment from the sump and from the control compartment for trapping water in the counterpressure compartment and substantially preventing the valve and control bodies from moving,

in a second position, opening the control valve and closing the drain valve for shifting the valve body in one direction between the open and closed positions by application of equal pressure through the flow lines to both compartments, and

in a third position, closing the control valve and opening the drain valve for depressurizing the counterpressure compartment while pressurizing the control compartment to oppositely shift the valve body.

4,673,163

ELECTROMAGNETIC ACTUATORS

Takeo Kushida, and Keiichi Yamada, both of Higashi-Matsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

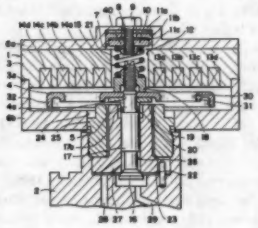
Filed Dec. 30, 1985, Ser. No. 814,724
Claims priority, application Japan, Jan. 11, 1985, 60-2696
Int. Cl.[4] F16K *31/06*; H01F *7/12*
U.S. Cl. 251—129.1 **4 Claims**

1. An electromagnetic actuator comprising:

a housing;

a stator of magnetic material fixed relative to said housing, said stator having a plurality of concentric coils mounted to a surface thereof and through each of which electric current is passed in an opposite direction to that of an adjacent coil for generating a respective magnetic flux around each of said coils; and

an armature slidably mounted relative to said housing and adjacent said stator, said armature comprising a thin magnetic plate and having a surface facing and disposed in a plane parallel to said surface of said stator, said armature being attracted to said stator to slide towards said stator when the electric current is passed through said coils of said stator,



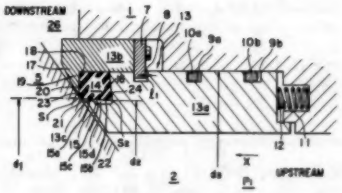
said armature having at least one slit extending therethrough and elongated in a radial direction from the center of said armature, the portion of said armature around the periphery of said slit being bent outward from the surface of said armature opposite said surface of said armature facing said stator, and said at least one slit being positioned on said stator opposed to said plurality of coils through which the electric current is passed for reducing eddy currents induced by the magnetic fluxes around each of said coils, which eddy currents interfere with the attraction of said armature to said stator.

4,673,164

SEALING MECHANISM FOR A BALL VALVE

Sadayuki Nakanishi, Hyogo, and Kenichi Hayama, Kobe, both of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Continuation of Ser. No. 598,535, Apr. 10, 1984, abandoned.
This application Feb. 21, 1986, Ser. No. 833,512
Claims priority, application Japan, Apr. 12, 1983, 58-64218
Int. Cl.[4] F16K *5/20*
U.S. Cl. 251—174 **5 Claims**



1. A ball valve assembly comprising:

(a) a valve housing (1) having a fluid conduit (2) therethrough;

(b) a ball-like valve body (5) movably mounted in said fluid conduit (2);

(c) a valve seat retainer (13) mounted in said valve housing (1) adjacent to said ball-like valve body (5), said valve retainer (13) comprising:

(i) an inner ring (13*a*) the radially inner surface of which acts as an extension of said fluid conduit (2);

(ii) means (11) biasing said inner ring (13*a*) towards said ball-like valve body (5) in the direction of fluid flow;

(iii) an outer ring (13*b*) which is tightly fitted to the radially outer circumference of said inner ring (13*a*) but which is axially movable relative thereto in the direction and counter to the direction of fluid flow (X); and

(iv) means (7, 8) limiting the axial movement of said outer ring (13*b*) relative to said inner ring (13*a*);

(d) a valve seat retaining groove (13*c*) being formed between the outer circumference of said inner ring (13*a*) and the inner circumference of said outer ring (13*b*), said valve seat retaining grove (13*c*):

(i) being approximately rectangular in cross-section;

(ii) having a radially inner, axially downstream edge opening which is in fluid communication with the interior of said fluid conduit (2);

(iii) having a radially inner circumferential surface (15) in said inner ring (13*a*) comprising an axially downstream, radially outward first cylindrical portion (15*a*); an axially upstream, radially inward second cylindrical portion (15*b*); and a connecting surface (15*c*) connecting said axially downstream, radially outward first cylindrical portion (15*a*) to said axially upstream, radially inward second cylindrical portion (15*b*);

(iv) having an axially upstream conical surface (16) in said inner ring (13*a*) which is inclined in the axially downstream direction from a radially inner axially upstream edge to a radially outer, axially downstream edge;

(v) having a radially outer circumferential surface (18) in said outer ring (13*b*) which is at least approximately concentric to both said radially outward first cylindrical portion (15*a*) and to said radially inward second cylindrical portion (15*b*) of said radially inner circumferential surface (15); and

(vi) having an axially downstream annular surface (19) in said outer ring (13*b*) which is at least approximately perpendicular to said radially inner and radially outer circumferential surfaces (15 and 18, respectively); and

(e) an annular valve seat (14) made of a resilient material tightly fitted within said valve seat retaining groove (13*c*), said annular valve seat (14):

(i) being at least approximately rectangular in cross-section;

(ii) having a rounded radially inner, axially downstream edge (23) which projects through said radially inner, axially downstream edge opening of said valve seat retaining groove (13*c*) to make sealing contact with said ball-like valve body (5);

(iii) having an axial length (12) which is at least approximately equal to the longest axial length (L2) of said valve seat retaining groove (13*c*); and

(iv) having a radial thickness (13) which is equal to or slightly smaller than the radial distance between said axially downstream, radially outward first cylindrical portion (15*a*) of said radially inner circumferential surface (15) and said radially outer circumferential surface (18).

4,673,165

WEED PULLER

Ralph F. Nelson, 10277 Sweet Creek Rd., Mapleton, Oreg. 97453, and Donald S. Stephen, 9812 SE. 33rd, Milwaukie, Oreg. 97222

Filed Apr. 14, 1986, Ser. No. 851,959
Int. Cl.[4] B66F *3/00*
U.S. Cl. 254—132 **4 Claims**

1. A weed puller, which comprises:

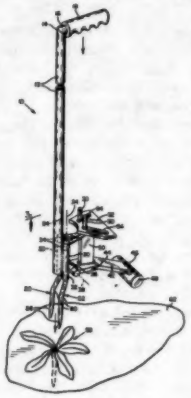
(a) a handle member, having an upper end and a lower end;

(b) two prong members, each separately and rotatably attached to the said handle member near the said lower end of the said handle member, the said attachment formed to permit each said prong member to rotate about a separate axis of rotation, these said axes of rotation being fixed parallel to each other and to the longitudinal axis of the said handle member at all times during use;

said prong members each having a lower, ground penetrating end which extends downward, and an upper end which extends generally upward, the said lower, ground penetrating end and the said upper end being offset from each other, and the said axes of rotation of the said prong members at the said attachment to the said handle member being located intermediate the said lower, ground penetrating end and the said upper end;

(c) a camming member, rotatably connected to the said handle member at the lower end of the said handle member about an axis transverse to the longitudinal axis of the said handle member, and located at the lower end of the handle member, which camming member extends above the said transverse axis of said rotatable attachment, and wherein said camming member is formed two diverging camming slots into which are slidingly positioned the said upper ends of the said prong members;

(d) a lever member, also rotatably attached, in cooperation with said camming member, about the said transverse axis of rotation, to the said lower end end of the said handle member, said lever member extending outward away



from said handle member, said lever member being rigidly fixed to the said camming member, and having an outer end;

(e) so that, with the said lower, ground penetrating end of the said prong members inserted vertically in the ground straddling the unwanted weed, pivoting the vertical said handle member about the horizontal said transverse axis towards the said outer end of the said lever member will move the said upper ends of the said prong members with respect to the said camming member and its camming slots, such movement causing the said upper ends of the said prong members to be cammed outwards away from each other within the said camming slots, such outward rotation of the said upper ends of the said prong members translating through the rotation of the said prong members to an inward rotation of the said lower, ground penetrating ends towards each other in parallel manner, so as to grasp the weed and its root;

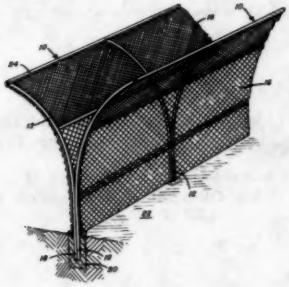
and continued pivoting of the said handle member towards the said outer end of the said lever member will pivot the weed puller about said outer end on the ground surface and thereby extract the weed grasped between the lower ends out of the ground.

4,673,166

SECURITY FENCE

Ellis C. MacDougall, 42 Woodwind Ct., P.O. Box 12521, Columbia, S.C. 29211

Filed Feb. 4, 1986, Ser. No. 826,020
Int. Cl.[4] E04H 17/00
U.S. Cl. 256—11 12 Claims



1. A security fence mounted to a stable base and defining a barrier to preclude passage of a person attempting to climb the fence from a first side thereof to a second side thereof as a confinement or exclusive means, said security fence comprising multiple laterally spaced fence posts, said fence posts being positioned to define a line dividing an area into first and second sides, each said fence post comprising a lower end portion anchored to the stable base with the remainder of the post supported therefrom and terminating in an upper terminal end portion, each said post including a vertical section extending upwardly from said stable base, and a generally inclined portion, comprising the major portion of the vertical height of the post, extending in a smooth unbroken configuration from said vertical section and terminating at said upper terminal end portion, said inclined portion being continuously generally inclined at approximately a 50° to 65° angle to the horizontal to a common side and to a point wherein said upper terminal end portion is positioned at a height above said base sufficient to preclude direct simultaneous physical access by a climber to said upper terminal end portion and said base, and at a position laterally removed from said lower end portion sufficient to preclude direct simultaneous physical access by a climber to said upper terminal end portion and the vertical section of the corresponding post below said continuously inclined major portion, fence paneling fixed to and between said posts and substantially coextensive with the height thereof, and additional security means extending downwardly from the upper terminal end portions of said posts and terminating in upwardly spaced relation above the vertical sections of the posts.

4,673,167

METHOD FOR INSTALLING A CONVERTER BOTTOM

Karl Brotzmann, and Paul-Gerhard Mantey, both of Sulzbach-Rosenberg, Fed. Rep. of Germany, assignors to Kloeckner CRA Technologie GmbH, Fed. Rep. of Germany

Continuation of Ser. No. 696,917, Jan. 31, 1985, abandoned. This application Sep. 16, 1986, Ser. No. 892,636
Claims priority, application Fed. Rep. of Germany, Feb. 2, 1984, 3403490
Int. Cl.[4] C21B 7/04
U.S. Cl. 266—281 21 Claims

1. A converter bottom for a converter vessel having vessel walls with a rounded interior liner contour and nozzles for the introduction of media comprising:

a bottom plate;

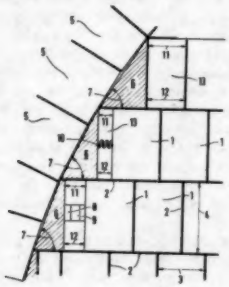
rectangular bottom bricks laid in such a manner as to cover the largest area of the bottom plate;

shaped bricks laid with the same orientation as the bottom bricks having one side fitted to and abutting said rounded interior liner contour of the vessel wall;

a free space exhibiting dimensions less than those of said bottom bricks and exceeding one joint width associated with said shaped bricks;

fitting bricks having different dimensions than the bottom bricks laid in the free space.

11. A method for installing a converter bottom on a bottom plate for a converter vessel having vessel walls with a rounded interior liner contour and nozzles for introduction of media comprising the steps of:



laying rectangular bottom bricks in such a manner as to cover the largest area of the bottom plate;

laying shaped bricks aligned with the same orientation as the bottom bricks having one side fitted to and abutting the interior liner contour of the vessel wall, said shaped bricks being of a size such that a free space exhibiting dimensions less than those of said bottom bricks and exceeding one joint width remains adjoining an associated bottom brick;

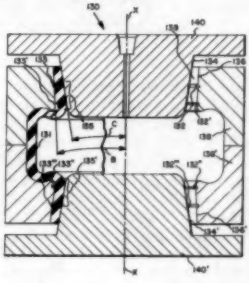
inserting fitting bricks having different dimensions than the bottom bricks in the free space.

4,673,168

AIRSPRING AND A METHOD FOR MAKING AIRSPRING FLEXIBLE MEMBERS

Ivan J. Warmuth, Akron, and Carl K. Safreed, Jr., N. Canton, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jun. 25, 1985, Ser. No. 748,539
Int. Cl.[4] B32B 31/04; F16F 5/00, 9/04
U.S. Cl. 267—64.27 14 Claims



1. A method for molding non-uniform diameter, flexible membranes for airsprings in a mold having a plurality of coaxial annular segments including a top and a bottom annular segment each containing a coaxial circular end bore with an inward taper, said plurality of segments forming a mold cavity having a predetermined shape said method comprising the steps of:

(a) plying up a plurality of rubber and fabric layers to form a uniform diameter, beadless, tubular preform with a predetermined wall thickness, having a first and second end portions;

(b) inserting said tubular preform into said mold;

(c) positioning said first and said second end of said preform onto first and second conical end plugs coaxially spaced away from said circular end bores, said conical end plugs having a complimentary shape to fit axially into said inward taper of said circular end bores of the mold with enough clearance to accommodate the tubular preform wall thickness;

(d) moving said top and said bottom segments axially outward to sealingly compress said tubular preform between said top and bottom end plugs and said top and bottom segments, said movement of the top and the bottom segments opening an annular space between said plurality of annular segments axially distal the end plugs;

(e) applying pressure to the tubular preform to deform the preform radially outwardly against the mold cavity;

(f) simultaneously with step (e) axially compressing said annular segments to gradually close up said annular space, at a rate sufficient to accommodate the axial shortening of the preform as it expands radially outward under pressure of step (e);

(g) continuing steps (e) and (f) until said preform completely conforms to the mold cavity and the plurality of annular segments of the mold are axially compressed together;

(h) heating said preform to permanently set the non-tubular shape by vulcanizing the rubber layers of said preform to form a non-uniform diameter, flexible membrane;

(i) removing said membrane from said mold.

4,673,169

ELASTIC MOTOR MOUNT

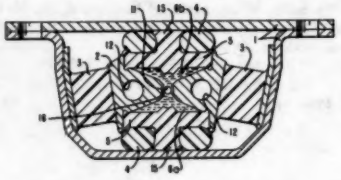
Jürgen Heitzig, Hanover, Fed. Rep. of Germany, assignor to Continental Gummi-Werke Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed Sep. 6, 1985, Ser. No. 773,448

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1984, 3433421

Int. Cl.⁴ F16F *15/04*; F16M *13/00*

U.S. Cl. 267—140.1 **4 Claims**



1. An elastic motor mount employed in motor mount damping regulatable to be variable by having at least one elastic shock-absorption element operational within a common fixed housing between the latter and a connecting element on one side thereof engaging said shock absorption element collectively being movable within and relative to said housing and that together therewith absorbs motor weight, and also having an external source of damping fluid therewith;

the improvement therewith comprising means forming a closed-off hollow space subdivided into two chamber portions thereof with an overflow region centrally therebetween as well as a connecting fitting that projects through the overflow region centrally thereof provided within said housing, and a damping fluid within said hollow space communicating centrally via the overflow region and through said connecting fitting with the external source of damping fluid for receiving varying amounts of said damping fluid therefrom so that elastic motor mount damping is regulatable during operation in a manner adaptable optimally to take up vibrations or oscillations in a range between short-stroke, high frequency acoustical vibrations or oscillations and also long-stroke, low-frequency deflections such as via roadway shocks, said connecting element engaging and surrounding said connecting fitting to maintain position thereof relative to said overflow region through which damping fluid communicates to effect expansion and contraction of the closed-off hollow space surrounding said connection element.

4,673,170

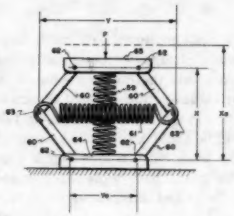
CONSTANT SPRING FORCE MECHANISM

Owen W. Dykema, 23429 Welby Way, Canoga Park, Calif. 91307

Continuation-in-part of Ser. No. 367,509, Apr. 4, 1982, Pat. No. 4,476,969. This application Oct. 10, 1984, Ser. No. 659,383

Int. Cl.⁴ F16F *3/02*

U.S. Cl. 267—174 **2 Claims**



1. A constant force spring mechanism comprising:

four articulated arms, each said arm comprising an upper link and a lower link, said links being connected at one of their ends forming an outwardly moving joint at the midway point of each said articulated arm;

a rectangular upper force plate and a retangular lower force plate opposed in parallel and transversely to said articulated arms;

each said articulated arm connecting an upper corner and lower corner of said force plates;

each said corner connection being a pivotal connetion;

a first helical extension spring connected parallel to said force plates and attached to the midway joints of said two opposed articulated arms on one side of said force plates for providing resistance to the compression when said force plates are pressed toward each other;

a second extension spring connected parallel to said force plates and attached to the midway joints of said other two opposed articulated arms on said other opposite side of said force plates for providing resistance to the compression when said force plates are pressed toward each other;

a positive helical compression spring positioned centrally and transversely between said force plates and perpendicular to said first and second extension helical springs;

means for connecting said positive helical compression spring to one of said force plates, leaving the other end abutting, but unconnected, to said other force plate;

said positive compression spring having an at-rest length sufficient to maintain a resistance to compressibility of the force plates when the spring mechanism is not in an at-rest position;

compression spring rates such that the positive spring rate of said positive compression spring is equal to the negative spring rate of the spring mechanism, such that resistance to compression of the spring mechanism is approximately independent of the degree to which said force plates are compressed toward each other.

4,673,171
AIR SUSPENSION

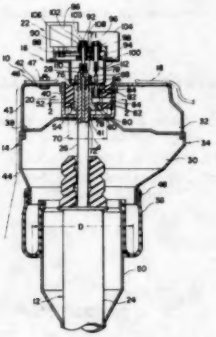
Shuuichi Buma, Aichi, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Dec. 14, 1984, Ser. No. 681,940

Claims priority, application Japan, Dec. 24, 1983, 58-197910[U]

Int. Cl.⁴ B60G *13/00*; F16F *9/00*

U.S. Cl. 267—8 R **6 Claims**



1. An air suspension comprising:

a shock absorber having a piston rod in which a control rod for adjusting damping force is disposed;

an air spring having a main air chamber and an auxiliary air chamber;

a valve body for affording and shutting off communication between both air chambers to adjust the spring constant of the air spring;

a support connected to a car body and including a rigid member with which said piston rod is coupled and in which said valve body is disposed and a bushing disposed diametrically outward of the rigid member and having a hole for an air passage between the air chambers which is controlled by said valve body; and

an actuator disposed above said support to operate said control rod and valve body, said actuator comprising a rotary means, a pair of rods disposed parallel to each other and extended toward said rigid member of said support, one being connected to said control rod and the other being connected to said valve body respectively and a means for transmitting the turning force of said rotary means to said pair of rods.

4,673,172
LEVELING VALVE WITH HEIGHT LIMIT

Roland Blanz, Heiligkreuzsteinach, Fed. Rep. of Germany, assignor to Graubremse GmbH, Heidelberg, Fed. Rep. of Germany

Filed Dec. 13, 1985, Ser. No. 808,834

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 3446810

Int. Cl.⁴ B60G *17/04*; F16F *5/00*

U.S. Cl. 267—64.11 **6 Claims**

1. Combination valve having leveling and height limiting sections for leveling and limiting the height of an air-suspended vehicle, the leveling section of said combined valve comprising:

(a) a first housing (1) having an elongated axis,

(b) an intake valve (7,11) supported within said first housing (1) and disposed to control pneumatic communication between a first port (2) in said first housing connectable to a compressed air source (4) and a second port (30) in said first housing connectable to an air-suspension bellows (40) via a switching load valve (32),

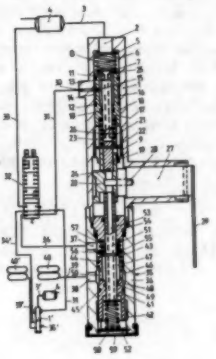
(c) a discharge valve (7, 25) supported within said first housing (1) and disposed to control pneumatic communication between said second port (30) and an outlet to the atmosphere,

(d) a control handle (27, 28, 29) supported within and extending from said first housing (1) and disposed whereby its angular position relative to said first housing (1) is responsive to the distance between the vehicle frame and the corresponding vehicle axle of the air-suspended vehicle, and

(e) a first control rod (19) axially aligned in said first housing (1) and operatively connecting said control handle (27, 28, 29); and said intake valve (7, 11) and said discharge valve (7, 25) whereby to actuate the valves in a predetermined manner responsive to the angular movement of said control handle (27, 28, 29);

the height limiting section (35) of said combined valve comprising:

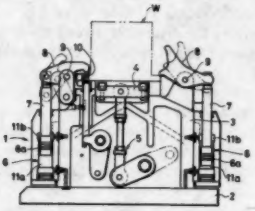
(f) a second housing (36) having an elongated axis secured adjacent one extremity thereof, and in axial alignment with said first housing (1),



(g) a closure valve (43, 56) axially aligned within said housing and having a valve body (56) and valve seat (43) adjustable relative to each other and disposed to control pneumatic communication between a fourth port (37) in said second housing (36) connectable to said switching load valve (32) and a fifth port (38) in said second housing (36) connectable to said air-suspension bellows (40), said fourth and fifth ports (37, 38) having axes perpendicular to the axis of said closure valve (43, 56), the closure valve being pneumatically sealed and axially accessible from the exterior of the other extermity of said second housing (36), permitting adjustment of the valve seat (43) relative to the valve body (56) without need for any dismantling of depressurization of the closure valve;

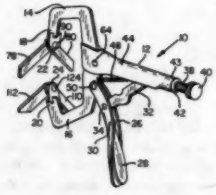
(h) a second control rod (51) axially aligned within said second housing (36) and operatively connecting said control handle (27, 28, 29) and said closure valve (43, 56) whereby to actuate the closure valve (43, 56) in a predetermined manner responsive to the angular position of said control handle (27, 28, 29).

4,673,173
WORKPIECE CLAMPING DEVICE
Toshiyuki Shochi, and Kenei Nakajima, both of Toyama, Japan, assignors to Kabushiki Kaisha Nippei Toyama, Tokyo, Japan
Filed Jan. 31, 1986, Ser. No. 824,471
Int. Cl.[4] B23Q *3/08*
U.S. Cl. 269—32 **2 Claims**



1. In a workpiece clamping device in which a plurality of operating cylinders driving clamping pawls adapted to clamp a workpiece are provided on a workpiece mounting jig and the operating cylinders are supplied with operating fluid from a fluid source through a fluid circuit, the improvement comprising: operating fluid flow-rate detecting means for detecting a flow rate of said operating fluid to said operating cylinders from said fluid source, said operating-fluid flow-rate detecting means being provided in said fluid circuit, wherein said operating-fluid flow-rate detecting means comprises a hydraulic motor and means for detecting a rate of rotation of said hydraulic motor, wherein said means for detecting a rate of rotation of said hydraulic motor comprises means for generating pulse signals with a frequency proportional to the rate of rotation of said hydraulic motor and means for counting the pulse signals outputted from said pulse signal generating means.

4,673,174
ANGLE CLAMPING TOOL
William D. Tabbert, 1040 21st St., Springfield, Oreg. 97477
Filed Jul. 11, 1986, Ser. No. 884,415
Int. Cl.[4] B25B *1/20*
U.S. Cl. 269—41 **13 Claims**



1. In a clamping tool having a handle portion in association with a locking mechanism, the improvement comprising:

upper and lower arms extending outwardly from said handle portion;

an upper jaw secured to said upper arm, said upper comprising a pair of elongate clamp members each having first and second ends, said first ends of said clamp members being pivotally secured to said upper arm so as to allow said clamp members to be positioned in a selected angled relationship with respect to each other;

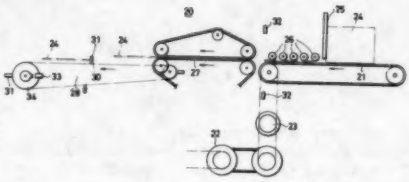
means for maintaining said clamp members of said upper jaw in said angled relationship during the use of said tool;

a lower jaw secured to said lower arm, said lower jaw comprising a pair of elongated clamp members each having first and second ends, said first ends of said clamp members being pivotally secured to said lower arm so as to allow said clamp members to be positioned in a selected angle relationship with respect to each other;

means for maintaining said clamp members of said lower jaw in said angled relationship during the use of said tool; and

each of said clamp members of said upper and lower jaws comprising a longitudinal gripping edge, said upper and lower jaws being adjustable to enable the grippng edges of said upper jaw to form an angle equivalent to that formed by said gripping edges of said lower jaw so that said upper and lower jaws can meet and engage two planar work pieces therebetween in an angled configuration.

4,673,175
PAPER FEEDING DEVICE FOR BOX MAKING MACHINE
Shinichi Morita, Yanai, Japan, assignor to Sun Engineering Co., Ltd., Tokyo, Japan
Filed Sep. 4, 1985, Ser. No. 772,506
Claims priority, application Japan, Sep. 27, 1984, 59-202552
Int. Cl.[4] B65H *7/02*
U.S. Cl. 271—10 **5 Claims**



1. A continuous paper feeding device for a box making machine comprising:

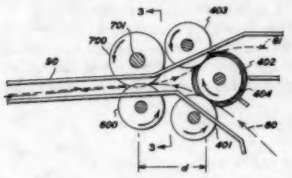
a paper feeding belt conveyor means for mounting a plurality of sheets of paper thereon and for passing one sheet of said paper through a gap at a lower end of a shutter means abutting on a front end of said paper and for feeding said paper continuously, a drawing belt conveyor means for receiving said paper from said paper feeding belt conveyor means, said drawing belt conveyor means operating at a higher speed than said paper feeding belt conveyor means and expanding a paper feeding interval, a timing correcting conveyor means for mounting said paper fed from said drawing belt conveyor means and for transferring said paper with a pawl means one sheet at a time to feed said paper at a predetermined timing, a paper detector means for detecting when said paper passes said shutter means on said paper feeding belt conveyor means, a pawl detector means for detecting a position of said pawl means of said timing correcting conveyor means, and a control device means for receiving outputs of both said paper detector means and said pawl detector means and for stopping the continuous feeding of said paper by stopping said paper feeding belt conveyor only when said paper is detected riding up onto said pawl means of said timing correcting conveyor means as said paper continues to advance and for restarting the continuous feeding of said paper again by waiting until said paper is not mounted on said pawl means.

4,673,176
SOFT NIP DAMPING INVERTER
Richard C. Schenk, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed Oct. 2, 1980, Ser. No. 193,228
Int. Cl.[4] B65H *29/20*
U.S. Cl. 271—186 **7 Claims**

1. In a tri-roll sheet inverter mechanism having an input nip and an output nip for feeding sheets into and out of a first end

of a sheet reversing chute to reverse the lead and trail edge orientation of the sheets, the improvement comprising:

retard drive nip means located at a second end of said chute to receive the leading edges of the sheets directed into said



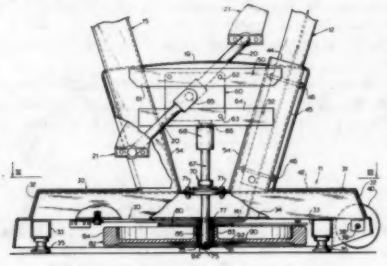
reversing chute and adapted to dampen the kinetic energy of an incoming sheet into said retard drive nip means while at the same time driving another sheet out of said retard drive nip means and into said output nip.

4,673,177

RESISTANCE FREEWHEEL MECHANISM

Eugene J. Szymski, Skokie, Ill., assignor to Excelsior Fitness Equipment Co., Northbrook, Ill.

Filed Nov. 12, 1985, Ser. No. 796,980
Int. Cl.[4] A63B *21/00*
U.S. Cl. 272—73 **9 Claims**



1. In an ergometric exerciser, a resistance freewheel mechanism comprising: drive shaft means, means for rotatably driving said shaft means, a flywheel rotatably mounted on said shaft means, first positive acting clutch means coupled to said shaft means and operable in response to rotation of said shaft means in one direction to positively interlock said flywheel and shaft means for conjoint rotation in said one direction, rotation of said flywheel in said one direction at a relative speed greater than said shaft means causing said first clutch means to release said flywheel for rotation relative to said shaft means, and second clutch means positively coupled to said shaft means and frictionally coupled to said flywheel, said second clutch means being operable, upon releasing operation of said first clutch means, to restrict rotation of said flywheel relative to said shaft means until the torque differential between said flywheel and second clutch means exceeds a predetermined torque value sufficient to overcome the frictional coupling between said second clutch means and flywheel whereupon said flywheel is released for freewheeling movement about said shaft means.

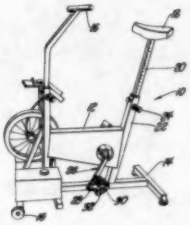
4,673,178

EXERCISE MACHINE HAVING VARIABLE RADIUS CRANK ARM

William H. Dwight, 430 Park St., Birmingham, Mich. 48009

Filed Jan. 24, 1986, Ser. No. 822,203
Int. Cl.[4] A63B *21/00*
U.S. Cl. 272—73 **12 Claims**

1. An exercise machine assembly (**10**) comprising: a body portion (**12**); handle means (**16**) mounted on said body portion (**12**) for being manually grasped; a seat (**18**) supported by said body portion (**12**) and spaced from said handle means (**16**); a pair of crank arms (**26**) supported by said body portion (**12**) for rotational movement; a foot pedal (**28**) mounted on each of said crank arms (**26**); adjustable pedal support means for adjustably fixedly supporting each of said pedals (**28**) at any one of a purality of positions along said entire length of said crank arms (**26**), and characterized by including a pedal block (**32**) and an axle member (**30**) extending therefrom and supporting said foot



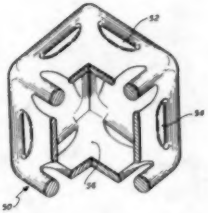
pedal (**32**) thereon for rotational movement relative thereto, said adjustable pedal support means including a clamping arm (**34**) pivotally connected to said crank arm (**26**) and crank arm locking means for locking said clamping arm (**34**) to said crank arm (**26**), said clamping arm having an unclamped position wherein said pedal block (**32**) is movable along said entire length of said crank arm (**26**) and a clamped position wherein said pedal block (**32**) is fixedly clamped between said crank arm (**26**) and clamping arm (**34**) at a position along said length of said crank arm (**26**).

4,673,179

EXERCISING DEVICE

Rudolf Pengler, 1400 Millersport Hwy., #26, Williamsville, N.Y. 14221

Filed Aug. 29, 1985, Ser. No. 770,840
Int. Cl.[4] A63B *11/00, 21/00*
U.S. Cl. 272—93 **6 Claims**



1. A weight-lifting device having an outer shell layer and an inner shell portion and comprising a geometrically regular body, including a plurality of polygonally-shaped flat sides, and a plurality of spaced handle means, each said handle means being defined by at least two elongate spaced openings in the edge surface of said body, which flank the intersection between two said flat sides, and which cooperate with at least the remaining portion of the surface intervening therebetween to define a plurality of elongated graspable hand-holds at said facial intersections, said hand-holds having a substantially cylindrical circumference which is capable of being substantially completely encircled by a user's hand, the inner shell portion of said device being accessible through said spaced openings for providing said inner shell with a different density

than that of said outer layer, so as to alter the overall weight of said device.

4,673,180

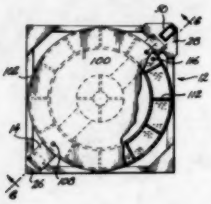
TORSO BUILDING EXERCISE MACHINE

Max Rice, Seattle, Wash., assignor to The Max Rice Corporation, Seattle, Wash.

Continuation-in-part of Ser. No. 628,485, Jul. 6, 1984, Pat. No. 4,538,807. This application Aug. 27, 1985, Ser. No. 769,955

Int. Cl.[4] A63B *23/02*

U.S. Cl. 272—146 **19 Claims**



1. A torso building exercise machine comprising:

(a) a stationary base means;

(b) a horizontally disposed rotatable turntable means mounted generally centrally of said base means, said turntable means having a single degree of freedom about its vertical axis;

(c) means for holding a selectively variable amount of liquid located near the periphery of said turntable means, including means restricting the extent of flow of liquid therein when said turntable means is being rotated;

(d) an upright handhold means mounted on said base means.

4,673,181

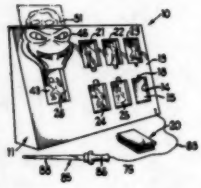
SKILL ACTION GAME

Patrick S. Baran; Sandra A. Levin, both of Chicago, and Wayne A. Kuna, River Forest, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Feb. 7, 1986, Ser. No. 827,343

Int. Cl.[4] A63F *9/00*

U.S. Cl. 273—1 GC **15 Claims**



1. A game comprising:

a housing;

an electric motor within the housing;

a power source contained in the housing for the electric motor;

a biased mechanical action feature carried by the housing

means releasably latching the action feature against the bias;

means driven by the motor releasing the latch means;

a plurality of slots in the housing;

an electrical contact strip disposed behind the slots;

a player manipulatable electrically conductive probe in electrical contact with the power source;

the probe being selectively insertable by the player into the slots;

contact between the probe and the strip completing an electrical circuit to energize the motor to release the latch means;

cards;

a plurality of recesses in the housing, each recess in communication with one of the slots and each recess being capable of receiving one of the cards;

means on the probe for removing a card from a respective recess by manipulating the probe within the slot; and

the means for removing the card including a blade with notches, the blade being selectively insertable into each slot.

14. A game comprising:

a housing;

an electric motor within the housing;

a power source contained in the housing for the electric motor;

a biased mechanical action feature carried by the housing;

means releasably latching the action feature against the bias;

means driven by the motor releasing the latch means;

a plurality of slots in the housing;

an electrical contact strip disposed behind the slots;

a player manipulatable electrically conductive probe in electrical contact with the power source;

the probe being selectively insertable by the player into the slots;

contact between the probe and the strip completing an electrical circuit to energize the motor to release the latch means;

the mechanical action feature including pieces moving in substantially opposite directions;

each piece having a rack;

the racks having substantially the same teeth spaced apart and facing each other;

gear means disposed between the teeth of each of the rack and in engagement with the teeth of each of the racks; and

the biasing means connected to only one of the pieces.

4,673,182

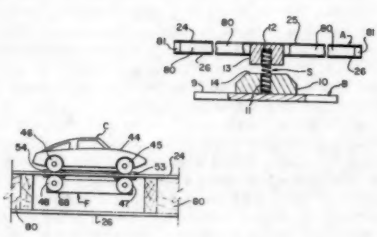
PIVOTED TRACK AND SLOT CAR AMUSEMENT DEVICE OR GAME

Robert L. Bowen, 925 Mailey Dr., Northglenn, Colo. 80233

Continuation of Ser. No. 656,542, Oct. 1, 1984, abandoned. This application Mar. 25, 1986, Ser. No. 843,869

Int. Cl.[4] A63B *67/14, 71/00*; A63G *1/00*; A63F *9/14*

U.S. Cl. 273—110 **17 Claims**



10. An amusement device or game including a track and an object to be moved around said track, comprising:

a track assembly having means providing a continuous track slot, having spaced, parallel edges, said track having a plurality of adjacent curves facing in different directions and connecting portions extending between said curves;

wheeled means supporting said object for movement around said track, said wheeled means engaging a portion of said track assembly on opposite sides of the edges of said track both above and below said track;

means engaging said track edges for causing said wheeled means to follow said track;

a base having a pedestal provided with an upright socket and a flat top;

a coil spring whose lower end extends into said pedestal socket; and

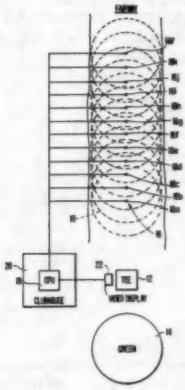
a block having a circular lower end mounted centrally of the underside of said track assembly and having an upwardly extending socket receiving the upper end of said coil spring, said pedestal and block being relatively closely spaced, whereby said track assembly may be tipped in any direction while supported by said lower end of said block engaging said top of said pedestal.

4,673,183

GOLF PLAYING FIELD WITH BALL DETECTING RADAR UNITS

Francis B. Trahan, CPO Box 239, (Kuza) Okinawa City, Okinawa, Japan 904

Filed Sep. 23, 1985, Ser. No. 779,092
Int. Cl.[4] A63B *69/36*
U.S. Cl. 273—176 A **2 Claims**



1. A golf playing area, comprising:

a playing field,

a tee area at one end of said playing field,

a plurality of radar ground surveillence units located along a straight line extending from said tee area on said playing field, at successively greater distances from said tee area, each of said units comprising means for detecting by radar all golf balls moving on the ground through a predetermined circular area of said playing field centered at the unit resulting from golf shots from said tee area, said units being successively spaced from each other at such distances that the predetermined circular areas of adjacent ones of said units at successively greater distances from said tee area overlap so that all of said predetermined areas define a combined continuous area, and

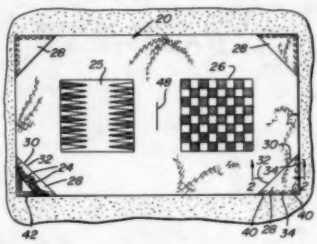
central control means, including a computer video display terminal adjacent said tee area and responsive to the output of said units, for calculating and displaying on said terminal a visual indication of the distance of the furthest one of said units detecting a golf ball moving in one of the predetermined areas containing said units from the tee area, and the sum of succession of distances calculated by said central control means.

4,673,184

SEATING SURFACE/GAMEBOARD DEVICE

Roy Sansores, 1933 Park Ave., Bensalem, Pa. 19020

Filed Dec. 26, 1984, Ser. No. 686,186
Int. Cl.[4] A63F *3/00*
U.S. Cl. 273—286 **6 Claims**



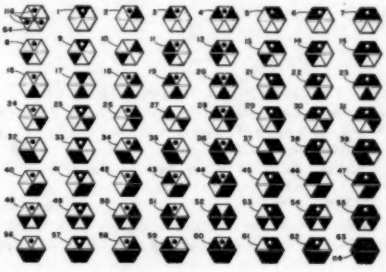
4. A seating surface/gameboard device comprising a web of flexible material arranged to be readily folded and unfolded for placement on an outdoor surface and sufficiently large to enable at least on person to sit thereon, said web including game indicia thereon and having at least one marginal edge including anchoring means located thereat, said anchoring means comprising at least one hollow pocket and having releaseably secureable fastening means located thereat to enable the opening of the pocket for receipt of particulate material therein to weight said edge down against the effects of wind, while providing a comfortable surface on which said person can sit, said releaseably secureable fastening means of said pocket providing ready ingress to the interior of said pocket to enable it to be filled with said particulate material and for sealing said material therein, said releasably secureable fastening means being readily openable to enable the emptying of said particulate material from said pocket to render said web flat, whereupon said web can be readily folded for compact storage, said web comprising an opening in an intermediate portion thereof and through which the shaft of an umbrella may be extended.

4,673,185

HEXAGON TILE GAME

Harold T. Morley, Jr., 2168 E. 37th St., Tulsa, Okla. 74105

Filed May 28, 1985, Ser. No. 737,725
Int. Cl.[4] A63F *9/20*
U.S. Cl. 273—294 **19 Claims**



17. A hexagonal sided tile piece used in playing a game with a plurality of said tile pieces, said piece comprising one planar surface which is divided into six equal spaces coinciding with each side of said hexagon, each of said spaces being of one color, said triangular spaces having alternating contrasting

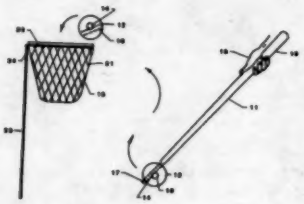
color indicia between spaces having no contrasting color indicia.

4,673,186

OUTDOOR GAME AND APPARATUS

William J. Walker, Spokane, Wash., assignor to Walker Enterprises, Inc., Townsend, Mont.

Filed Mar. 14, 1986, Ser. No. 839,546
Int. Cl.[4] A63B *67/12, 65/12*
U.S. Cl. 273—399 **10 Claims**



1. An outdoor game apparatus comprising:
(a) An elongate rod having a gripping end and a tip end;
(b) A projectile having at least one substantially centered aperture therein and an off-center aperture with a longitudinal axis substantially normal to the longitudinal axis of said center aperture wherein said tip end of said elongate rod is adaptable to being inserted in either of said apertures in said projectile; and
(c) A goal at which the projectile is targeted.

9. A method of playing an outdoor game, the method comprising the steps of:
(a) providing a number of players an equal number of elongate rods having a gripping end and a tip end;
(b) providing said players a like number of spherically shaped balls having at least one substantially centered aperture therein and an off-center aperture with a longitudinally axis substantially normal to the longitudinal axis of said centered aperture, each of which said apertures are adaptable to having said elongate rod inserted therein;
(c) providing a plurality of goals arranged in an organized manner;
(d) selectively tossing said projectile by use of said elongate rod at said goals;
(e) scoring the number of attempts at shooting the projectile at the goals; and
(f) determining the outcome of the game by the lowest number of attempted shots.

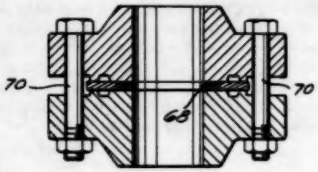
4,673,187

BIMETALLIC SPIRAL WOUND GASKET

Larry K. Hanson, Los Alamitos, and Gregory M. Pritchett, Long Beach, both of Calif., assignors to Fluorocarbon Company, Los Alamitos, Calif.

Filed Jul. 9, 1985, Ser. No. 753,273
Int. Cl.[4] F16J *15/12*
U.S. Cl. 277—26 **13 Claims**

1. A gasket comprising multiple windings of a spirally wound temperature-sensitive strip which form a ring, said strip being folded to form a V-shape along the length of the strip, the convex side of said strip having a different rate of thermal expansivity than the concave side, so that differing amounts of thermal expansion or contraction of said sides cause said V-shaped fold to open or close, resulting, respectively, in the spreading apart or the contraction of the edges of said strip, and the increased or decreased degree of sealing engagement between the edges and the components to be sealed adjacent th edges, said gasket further comprising a strip of suitable filler



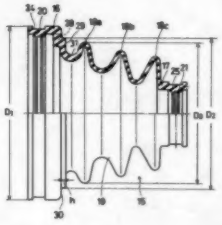
material wound alternately between the windings of the temperature-sensitive strip.

4,673,188

BOOT WITH BRACING BOSS PORTION FOR UNIVERSAL JOINT

Yutaka Matsuno; Yasunori Hatanaka, both of Toyota; Hirokazu Shimizu, Okazaki; Masahiro Ishigaki, Tsu; Hiroshi Harada, Tsu; Michihiro Kawada, Tsu, and Yasukuni Wakita, Yao, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha Toyo Tire & Rubber Co., Ltd., Toyota, Japan

Filed Jul. 29, 1986, Ser. No. 891,729
Claims priority, application Japan, Sep. 9, 1985, 60-137720[U]
Int. Cl.[4] F16J *3/04, 15/52*
U.S. Cl. 277—212 FB **3 Claims**

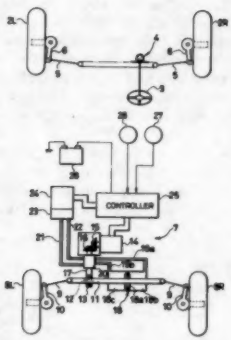


1. A boot for a universal joint for linking a driving shaft and a joint case, which boot is attached to cover the universal joint, interconnecting between the driving shaft and the joint case and is formed integrally of:
a large-diameter cylindrical portion adapted to be secured at one end to the joint case and a small-diameter cylindrical portion adapted to be secured at the other end to the driving shaft; a central annular bellows portion extending between said both portions, said bellows portion having ridge portions whose diameters are gradually decreased from the large-diameter portion to the small-diameter portion; and a bracing boss portion formed radially inwardly of said large-diameter portion to extend between it and said bellows portion;
said boss portion having a wall thickness of 2 to 3 times an average wall thickness of the bellows portion and being profiled at the inner face thereof to abuttingly contact with the edge face of the joint case and at the outer face thereof so that it blends smoothly into the outer face of the bellows portion in a flush surface with each other, said bellows portion having, at a zone on the large-diameter side extending from the end to the crest of a first ridge portion of a largest diameter thereof, wall thicknesses gradually increasing from the latter to the former, whose maximum value is a half the wall thickness of the boss portion.

4,673,189
VEHICLE STEERING SYSTEM

Hirotaka Kanazawa; Takeshi Tanaka; Shigeki Furutani, and Akihiko Miyoshi, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Japan

Filed Jun. 19, 1986, Ser. No. 875,968
Claims priority, application Japan, Jun. 22, 1985, 60-136551
Int. Cl.[4] B62D 7/00
U.S. Cl. 280—91 6 Claims



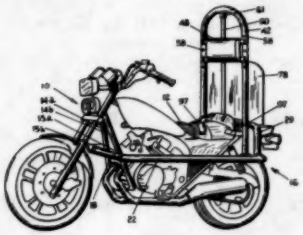
1. A steering mechanism of a vehicle including front wheel steering means for steering front wheels of the vehicle, operating means for effecting a steering movement of said front wheel steering means to a desired angle, rear wheel steering means for steering rear wheels of said vehicle, control means for effecting a steering movement of said rear wheel steering means in relation with the steering movement of the front wheels, said control means including rear wheel steering angle setting means for determining a desired steering angle of the rear wheels in accordance with a steered angle of the front wheels and actuating means for moving said rear wheels to said desired steering angle of the rear wheels, characterized by front wheel steered angle detecting means for detecting the steered angle of the front wheels and producing a front wheel steered angle signal which is applied to said rear wheel steering angle setting means, said rear wheel steering angle setting means including means for determining said desired steering angle of the rear wheels so that a ratio of the steering angle of said rear weheel to the steering angle of said front wheel as considered in the same direction of steering is increased in accordance with an increase in the steered angle of the front wheel.

4,673,190
PROTECTIVE BAR ASSEMBLY FOR MOTORCYCLE

Russell W. Ahlberg, 2759 Leonard St., N.W., Grand Rapids, Mich. 49504

Continuation-in-part of Ser. No. 655,053, Sep. 27, 1984, abandoned. This application Nov. 6, 1985, Ser. No. 795,515
Int. Cl.[4] B62J 27/00
U.S. Cl. 280—289 G 25 Claims

1. A protective bar assembly for a motorcycle having a frame, engine, seat, front wheel fork, rear wheel, and foot rests, the frame having a front portion attached to the front wheel fork and extending downwardly to a lower portion that supports the engine, a rear portion of the frame extending upwardly from the engine and having an upper portion adjacent to the rear of the seat and the top of the rear wheel of the motorcycle, the protective bar assembly comprising a front bar mounted transversely to the front portion of the frame and extending outwardly from the sides of the motorcycle, a rear bar being mounted transversely to the upper rear portion of the frame behind the motorcycle seat and above the rear wheel and extending outwardly from the sides of the motorcycle, the protective bar assembly further including a side bar attached to the front and rear bars on each side of the motorcycle, the side bars being shaped and positioned to protect the legs of a rider

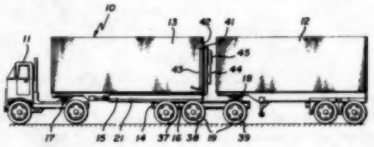


from impact with an automobile bumper colliding with the side of the motorcycle.

4,673,191
TANDEM TRAILER SYSTEM

Gerard Arguin, Spencer, Mass., assignor to Arguin Trailer Frames, Inc., Spencer, Mass.

Continuation of Ser. No. 702,009, Feb. 15, 1985, Pat. No. 4,598,924, which is a division of Ser. No. 520,993, Aug. 9, 1983, and Ser. No. 294,775, Aug. 20, 1981, Pat. No. 4,400,004. This application May 12, 1986, Ser. No. 861,713
The portion of the term of this patent subsequent to Aug. 23, 2000, has been disclaimed.
Int. Cl.[4] B62D 53/08
U.S. Cl. 280—408 3 Claims



1. Trailer system, comprising:

(a) a trailer unit, including a cargo container to be drawn behind a highway tractor and behind which can be drawn a second trailer unit,

(b) a chassis on which the container is mounted, the chassis having an upper portion and a lower portion of substantially equal length, the lower portion being formed of at least two spaced, parallel beams, the said lower portion being longitudinally slidable relative to the upper first portion from a first portion generally co-extensive with the upper portion to a second position where it extends beyond the end of the cargo container,

(c) a first attaching means associated with the front end of the container for connection to the highway tractor,

(d) a second attaching means including a fifth wheel associated with the lower portion of the chassis, so that, when the second portion is in the second position, another trailer can be attached to it, the second attaching means being located on the lower portion far enough rearwardly that the front end of the second trailer unit can swing relative to the cargo container during turning without striking the rear end of the cargo container, and

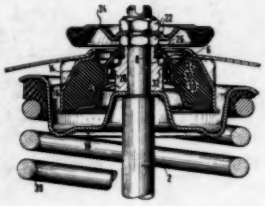
(e) three sets of wheels mounted on the said lower portion of the chassis.

4,673,192

RESILIENT MOUNT FOR TELESCOPIC STRUTS

Peter Krehan, Russelsheim, and Werner Oppelt, Astheim, both of Fed. Rep. of Germany, assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 6, 1986, Ser. No. 836,705
Int. Cl.[4] B60G *11/56*
U.S. Cl. 280—668 3 Claims



1. An upper mount for operatively mounting a steerable vehicle suspension strut to the body work of a vehicle having a reciprocally movable piston rod extending to a terminal end portion, a sleeve mounted on said upper end of said piston rod, said sleeve having an upper end defining an inner ball race ecompassing said piston rod, a train of balls operatively mounted on said race, a cup-like retainer mounted over said sleeve, said cup-like retainer having a spherical upper portion forming an outer race for said train of balls, an annulus of resilient material supported on said retainer, an annular thrust plate operatively mounted on said annulus of resilient material having an upper portion adjacent to the underside of the bodywork of the vehicle, and means to secure said sleeve to the upper end of said piston rod so that said sleeve and said train of balls and said spherical upper portion of said retainer cooperate to form a cardian-type connection coupling said piston rod to said bodywork of said vehicle to accommodate the angular motions of suspension travel and steering loads applied to said strut.

4,673,193

VEHICLE SUSPENSION APPARATUS

Kazuyoshi Kobayashi, Oobu; Shozo Takizawa, Okazaki; Tadao Tanaka, Okazaki; Mitsuhiko Harara, Okazaki; Yasutaka Taniguchi; Masanaga Suzumura, both of Nagoya; Naotake Kumagai, Aichi, and Minoru Tatemoto, Okazaki, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 17, 1985, Ser. No. 735,447
Claims priority, application Japan, May 22, 1984, 59-74691[U]; May 22, 1984, 59-74694[U]; Dec. 25, 1984, 59-201447[U]; Dec. 25, 1984, 59-201451[U]; Jul. 25, 1985, 60-112664[U]
Int. Cl.[4] B60G *21/06*
U.S. Cl. 280—707 23 Claims

1. A vehicle suspension apparatus having at least position control function, comprising:

fluid spring chambers provided for front and rear wheels, respectively;

fluid supply means for supplying a fluid to said fluid spring chambers from a fluid source through a supply control valve;

fluid exhausting means for exhausting the fluid from said fluid spring chambers through an exhaust control valve;

a front left wheel three-direction valve, a front right wheel three-directional valve, a rear left wheel three-direction valve and a rear right wheel three-directional valve which are inserted between said fluid spring chambers and said exhaust control valve, respectively;

a front wheel communication path, one end of which is connected to said front left wheel three-directional valve and the other end of which is connected to said front right wheel three-directional valve;

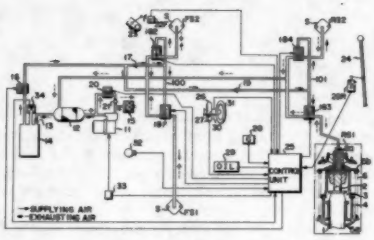
a rear wheel communication path, one end of which is connected to said rear left wheel three directional valve and the other end of which is connected to said rear right wheel three-directional valve,

said fluid supply means being arranged such that the fluid passing through said supply control valve is supplied to said front wheel fluid spring chambers through said front wheel communication path and to said rear wheel spring chambers through said rear wheel communication path,

each of said three-directional valves being located in a first position where said fluid spring chambers communicate with the corresponding communication paths or in a second position where said fluid spring chambers communicate with said exhaust control valve, respectively;

a position change sensor for detecting a change in position of the body;

position control means for receiving a signal from said position change sensor and selectively generating position contorl signals to said supply control valve, said exhaust control valve and said three-directional valves so as to



supply a predetermined amount of the fluid to the contracted fluid spring chambers and exhaust a predetermined amount of the fluid from the extended fluid spring chambers with respect to a position change direction;

height sensors for detecting front and rear heights of the vehicle; and

height control means for receiving signals from said height sensors, comparing the received signals with target heights, and selectively generating height control signals to said supply control valve, said exhaust control valve and said three-directional valves so as to set current heights at the target heights,

said fluid supply means including a supply path selector valve for selecting one of small- and large-diameter paths of the fluid to be supplied to said fluid spring chambers,

said height control means controlling said supply path selector valve in said fluid supply means to select said small-diameter path when the height control signals are generated, and

said position control means controlling said supply path selector valve in said fluid supply means to select said large-diameter path when the position control signal is generated.

4,673,194

AUTOMOTIVE SUSPENSION CONTROL SYSTEM WITH SELF-ADJUSTMENT FEATURE

Fukashi Sugasawa, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jun. 13, 1986, Ser. No. 873,995
Claims priority, application Japan, Jun. 14, 1985, 60-129584
Int. Cl.[4] B60G *11/26*
U.S. Cl. 280—707 17 Claims

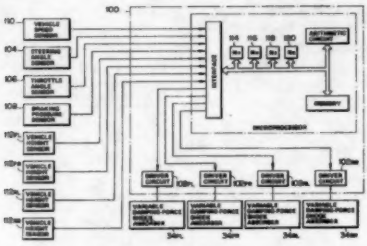
1. An automotive vehicle suspension control system comprising:

a vehicular suspension system with damping characteristics

variable at least between a first mode and a second mode, the latter of which provides harder damping characteristics than said first mode, in response to a control signal;

a sensor monitoring a preselected suspension control parameter and producing a sensor signal having a value indicative of a vehicular driving condition represented by said preselected suspension control parameter;

first means for comparing said sensor signal value with a threshold value and producing said control signal ordering said vehicular suspension system from said first mode



to said second mode when said sensor signal value is greater than said threshold value;

second means for counting occurrences of said control signal ordering said vehicular suspension system from said first mode to said second mode and producing a counter signal having a value representative of the counted value; and

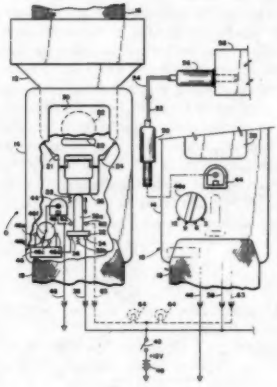
third means for detecting when said counter signal exceeds a first reference value and in such cases, modifying said threshold value so as to lower the sensitivity of suspension control to said sensor signal.

4,673,195

AUTOMOTIVE SEAT BELT ASSEMBLY FOR ENCOURAGING PASSENGER USE

James B. Boyd, Rte. 6, Box 6052, Hermiston, Oreg. 97838, and Kathleen A. Abell, Rte. 2, Box 2713, La Grande, Oreg. 97850

Filed Jan. 21, 1986, Ser. No. 820,668
Int. Cl.[4] B60R *22/00*
U.S. Cl. 280—801 **6 Claims**



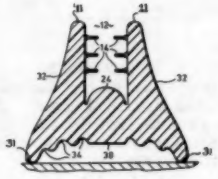
1. In a vehicle seat belt having a pair of selectively detachable belt portions for securing a passenger when said portions are coupled together, and selectively detachable belt coupling means for coupling said belt portions together, the improvement which comprises an electrical switch connected to an electrical power source and having selective energizing and de-energizing positions, a passenger-accessible electrical outlet connected to said switch so as to be selectively energized when said switch is in said energizing position and de-energized when said switch is in said de-energizing position, and means interconnecting said switch with said belt coupling means for placing said switch in said energizing position automatically in response to the coupling of said belt portions by said belt coupling means, and automatically placing said switch in said de-energizing position in response to the decoupling of said belt portions by said belt coupling means.

4,673,196

GUARD FOR SKATES

Bradley G. Hall, 60 Redcar Ave., Islington, Toronto, Ontario, Canada M9B 1K1

Filed Apr. 9, 1982, Ser. No. 366,857
Claims priority, application Canada, Mar. 1, 1982, 397297
Int. Cl.[4] A63C *3/12*
U.S. Cl. 280—825 **12 Claims**



1. Skate guard of flexible resilient compressible material:

a longitudinally extending body,

defining a longitudinally extending upwardly opening groove of a width to receive a skate blade,

fins inwardly extending into said groove from each of the defining side walls of the groove, defining a transverse clearance of less than the thickness of the skate blade between the inner extremities of the fins extending from opposite sides of the groove,

said fins being designed to be flexible and to be directed downwardly by the insertion of a skate blade into said groove,

wherein said guard and said fins are formed by an integral extrusion,

said guard in transverse cross-section widening toward the base thereof.

4,673,197

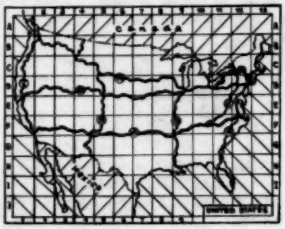
MAP DISPLAY APPARATUS AND METHOD

Manya Shtipelman, and Boris A. Shtipelman, both of 35 Shirewood Dr., Rochester, N.Y. 14625

Filed Jul. 25, 1986, Ser. No. 889,432
Int. Cl.[4] G09B *29/00, 29/04, 29/10*; G09F *7/00*
U.S. Cl. 283—34 **13 Claims**

1. The method of displaying the route of a trip within a preselected geographical region which region has been subdivided into a first predetermined number of discrete zones, which method comprises the steps of: selecting a second predetermined number of orientations for the zones; providing a plurality of sets of cards with the number of said cards in said plurality of sets being equal to the product of said first predetermined number and said second predetermined number and with the cards of each of said plurality of sets of cards being uniquely associated with a single one of said zones and containing said second predetermined number of cards; providing on each of said cards in each of said plurality of sets a map display representing the zone associated with the said card, with each card having its map display oriented in a different one of said

selected orientations and wherein all of the indicia on each display is oriented for reading towards the same edge of the card irrespective of the orientation of the map display thereon; determining which of said zones are traversed by said route

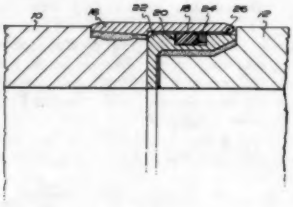


and the sequence of traversals of said zones by said route; arranging said cards into a deck with each card in sequential order as determined by said sequence of traversal; and displaying each card in succession as the trip progresses from zone to zone.

4,673,198
SEWER PIPES

Robert J. Pritchatt, Shelley, England, assignor to Naylor Bros. (Clayware) Limited, Barnsley, England

Filed Oct. 29, 1985, Ser. No. 792,516
Claims priority, application United Kingdom, Nov. 6, 1984, 8428037; Mar. 21, 1985, 8507378
Int. Cl.[4] F16L *21/02*
U.S. Cl. 285—292 **6 Claims**



1. A water tight connector for sewer pipes used in a moling or jacking operation, comprising:

an end portion of a said sewer pipe of substantially the same internal diameter as that of said pipe and of smaller outer diameter than the outer diameter of said pipe for it to define a radial shoulder on said pipe, said end portion having an external circumferential groove;

a resilient sealing ring contained within said groove and having a thickness in the radial direction of said pipe greater than the depth of said groove;

a retainer member positioned at least partially within said groove and extending radially outwardly thereof at a position intermediate said sealing ring and the radial shoulder of said pipe, said retainer member being formed from a substantially rigid and incompressible material and being capable of resilient radially inward deformation; and,

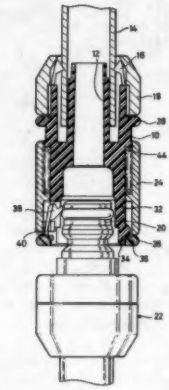
a connector sleeve having an outer diameter substantially that of the outer diameter of said pipe, which has been forced over said sealing ring and said retainer, and, which compressively engages said sealing ring and said retainer;

said connector sleeve having an internal radial shoulder facing said retainer member and operative to engage behind said retainer member, which acts as a radially outwardly expandable latch and prevents disengagement of said sleeve from said end portion.

4,673,199
HOSE COUPLING

Bruce Renfrew, Leicester, England, assignor to Hozelock-ASL Limited, Aylesbury, England

Filed Jun. 4, 1986, Ser. No. 870,725
Claims priority, application United Kingdom, Jun. 11, 1985, 8514678
Int. Cl.[4] F16L *37/12*
U.S. Cl. 285—316 **19 Claims**



1. A hose coupling comprising a tubular body with a central bore having one end for communication with a hose and the other end for the reception of a spigot of a cooperating coupling, an outer sleeve surrounding the body and capable of axial sliding movement with respect to the body, and a plurality of locking members which extend through openings in the body to project into said other end of the bore, the locking members being interconnected by a ring which is located axially and rotationally with respect to the body, the locking members being integrally formed with the ring from a synthetic plastic material, each locking member projecting from the ring and being capable of flexing with respect to the ring as a result of the inherent flexibility of the plastic material, each locking member being capable of movement between a normal locking position in which the locking member projects into the bore to retain the spigot therein and a release position in which the locking member is urged to a retracted position to enable the spigot to be withdrawn from the bore, the locking members being forced to their release positions by axial movement of the sleeve towards said one end of the bore, the sleeve carrying a plurality of formations equal in number to the number of locking members, each said formation engaging a corresponding locking member to urge the latter to its release position when the sleeve is moved to its release position.

4,673,200
FLUID JOINT

Fumio Miyauchi, Kanagawa, Japan, assignor to Ikeda Bussan Co., Ltd., Ayase, Japan

Filed Dec. 17, 1985, Ser. No. 809,739
Claims priority, application Japan, Jan. 24, 1985, 60-8310[U]
Int. Cl.[4] F16L *37/12*
U.S. Cl. 285—319 **7 Claims**

1. A fluid joint for joining two tubes, comprising:

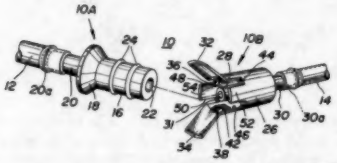
a male member having a longitudinally extending through passage, said male member including a cylindrical part, a frusto-conical part and a tubular part, said parts being

coaxially united in this order, said frusto-conical part being arranged with its concical surface facing towards said cylindrical part and said tubular part being adapted to connect with one of the two tubes;

a female member having a longitudinally extending through passage, said female member including a cylindrical receptacle part sized to snugly receive therein the cylindrical part of said male member and an outer tubular part coaxially united with said receptacle part and projected outwardly therefrom, said outer tubular part being adapted to connect with the other of the two tubes;

locking means for locking, upon coupling therebetween, said male and female members together while permitting relative rotation about the axis of the same;

releasing means for disabling said locking means when actuated; and



sealing means for sealing a clearance which may be defined between said cylindrical part of said male member and said cylindrical receptacle part of said female member when these two members are coupled;

wherein said locking means comprises a pair of locking pawls which are integrally formed on the diametrically opposed portions of said cylindrical receptacle part of said female member, said locking pawls being projected inwardly of said receptacle part and, upon proper coupling of said male member and female member, lockingly engaged with an outer peripheral portion of said frusto-conical part of the male member; and

wherein said releasing means comprises a pair of lugs which are integrally formed on said cylindrical receptacle part of the female member and extend diagonally outwardly from said diametrically opposed portions where said locking pawls are positioned respectively.

4,673,201

PIPE CONNECTOR

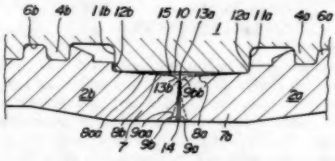
Geoffrey C. Dearden; Edward J. Speare, both of Bedford; Katsuo Ueno, Hertfordshire, all of England, and Donald N. Jones, Aberdeenshire, Scotland, assignors to Hunting Oilfield Services (UK) Limited, Aberdeen, Scotland and Kawasaki Steel Corporation, Kobe, Japan

Filed Aug. 28, 1984, Ser. No. 645,017

Claims priority, application United Kingdom, Sep. 1, 1983, 8323508

Int. Cl.[4] F16L *15/00*

U.S. Cl. 285—333 **12 Claims**



1. A pipe connector including a female member having an internal circumferential surface at each end, each end provided with an internal thread, and a pair of male members each having an external circumferential surface corresponding to a respective one of the circumferential surfaces of the female member and provided with a thread for threaded engagement with the corresponding thread of the female member, the female member being provided internally with shoulders for limiting axial movement of the male members therein, each male member being provided with a corresponding shoulder, and each male member being provided at its end face with an annular nose having an axially directed primary sealing surface for general axial abutment with the primary sealing surface of the nose of the other male member, and an adjacent external circumferential secondary sealing surface for generally radial contact over its length with an internal circumferential secondary sealing surface provided on the female member intermediate the internal circumferential surfaces thereof, wherein the primary sealing surfaces of the male members are initially shaped so that, when they are initially brought into contact, there is a gap between parts of the surfaces which progressively widens in a radially inwardly direction, and the male and female secondary sealing surfaces are initially shaped so, and have diameters arranged so, that there is always initially a gap therebetween which extends the length of overlap of the male and female secondary sealing surfaces in the region of the contacting primary sealing surfaces, the gaps being closed when the male members and the female member are fully engaged together, the ends thereof abutting against each other and moving radially outwardly to fill the gaps.

4,673,202

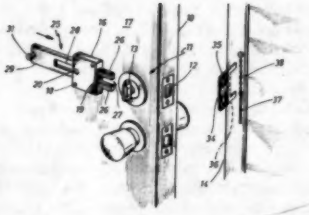
DOOR LOCKING DEVICE

David P. Willis, 4400 Memorial #3047, Houston, Tex. 77077

Continuation of Ser. No. 346,196, Feb. 5, 1982, abandoned. This application Sep. 16, 1985, Ser. No. 776,571

Int. Cl.[4] E05C *1/16*

U.S. Cl. 292—162 **11 Claims**



1. For use with a door closing shut adjacent a door jamb, the door jamb including a dead bolt receiving striker plate and the door supporting a door locking dead bolt means having an interiorally exposed key operated lock and an interiorally exposed key operated lock and interiorally exposed thumb knob with a locking surface thereon wherein the locking surface rotates between first and second positions indicative of dead bolt movement between locked and unlocked positions relative to the striker plate on the door jamb, an interiorally located door locking apparatus comprising:

(a) support means mountable on the interior surface of the door;

(b) dead bolt slide means slidable between first and second positions, said slide means supported by said support means for sliding movement;

(c) elongated locking means cooperative with the thumb knob locking surface to lock the thumb knob at a rotated position after dead bolt insertion into the striker plate;

(d) cooperative striker plate means aligned with said dead bolt slide means to receive said dead bolt slide means on movement to the second position thereof and wherein said elongate locking means is held to lock the thumb knob, said cooperative striker plate means being mountable on

the door jamb at a location to cooperate with said dead bolt slide means in holding the thumb knob in the locked rotated position; and

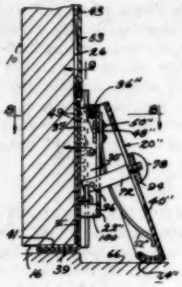
(e) auxiliary locking means for engaging said dead bolt slide means in a locking relationship to prevent movement between the first and second positions.

4,673,203

SPRING BIASED DOOR STOP HAVING A VERTICALLY MOVABLE TENSION MEMBER

Jimmie A. Chezem, Sparta, Tenn., assignor to Plateau Products Corp., Sparta, Tenn.

Filed Oct. 15, 1985, Ser. No. 787,627
Int. Cl.[4] E05C *17/54*
U.S. Cl. 292—339 18 Claims



1. A door stop, comprising:

a base for mounting upon a door adjacent to a lower marginal edge portion of an internal surface of said door, said base including a bight portion and a first vertically disposed slot defined within and through said bight portion;

an elongated prop member defining an outer surface and further defining a second longitudinal slot within and through said outer surface;

pin means in operative relationship with said base and said prop member for pivotally mounting an upper portion of said prop member to an upper portion of said base and for enabling movement of said prop member about a substantially horizontal axis between a first inoperative position with a lower end of said prop member located above the floor and a second operative position with said lower end of said prop member located below said lower marginal edge portion and in engagement with said floor;

means in operative relationship with said base and said prop member for yieldingly biasing said prop member toward said inoperative position; and

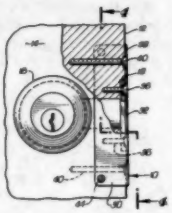
tension member means in operative relationship with said base and with said prop member for controlling movement of said prop member with respect to said base, said tension member means including an elongated curved rigid member having a concave portion thereof oriented toward said pin means, said rigid member defining first and second ends and extending between and through said first and said second slots in slidable relationship with said slots, a first head member removably attached to said first end and engaging said outer surface of said prop member, means in operative relationship with said second end and with said base for contacting an inner surface of said bight portion adjacent to said first slot, and means in operative relationship with said second end for counterbalancing the weight of said first head member and for maintaining a predetermined portion of said first head member in flush contact with said outer surface.

4,673,204

INTERLOCKING PROTECTIVE DOOR SHIELD

Howard M. Allenbaugh, Fountain Valley, Calif., assignor to M.A.G. Engineering & Mfg. Co., Inc., Huntington Beach, Calif.

Continuation of Ser. No. 496,596, May 20, 1983, abandoned.
This application Apr. 19, 1985, Ser. No. 725,141
Int. Cl.[4] E05C *21/00*
U.S. Cl. 292—346 4 Claims



1. An improved door shield for use in combination with a lock or latch mechanism mounted in the swingable edge of a door and retained by anchor screws, said mechanism having a face plate defining a bolt aperture that fits flush with said edge and a bolt slidable between (1) a locked position in which said bolt projects through said aperture and (2) an unlocked position in which said bolt is retracted within said door, said face plate defining at least two face plate screw holes for receiving said anchor screws to secure said face plate to said door, and countersunk recesses surrounding said holes, said shield being generally U-shaped and comprising:

a center section; and

two parallel side panels integrally formed with said center section and extending perpendicularly thereto, said shield being thus adapted to overlie said face plate and to snugly engage said edge in the region of said mechanism with said side panels overlying opposite sides of the door;

said center section defining an opening for passage of said bolt, at least two shield screw holes for alignment with said face plate screw holes, perimeter portions of said center section surrounding said shield screw holes forming malleable circular lips which at least partially overlie said recesses when said shield screw holes and said face plate screw holes are aligned, said lips being tapered such that the diameters of said screw holes decrease from a relatively large diameter adjacent to the outer surface of said center section to a relatively small diameter adjacent to the inner surface of said center section, whereby said lips can be deformed conically into said countersunk face plate screw holes and thus forced into said face plate screw holes to interlock said shield and said face plate.

4,673,205

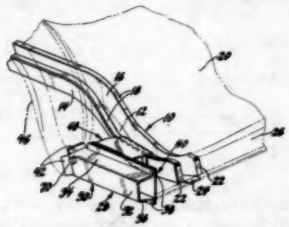
VEHICLE BODY STRUCTURE

David F. Drewek, Sterling Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 16, 1986, Ser. No. 874,464
Int. Cl.[4] B60R *19/04*
U.S. Cl. 293—132 6 Claims

1. In a vehicle body having a bumper structure receiving impact loads, an elongated rail structure extending longitudinally of the vehicle and receiving impact loads from the bumper structure, and a hollow rocker structure extending longitudinally of the vehicle and including upper and lower walls joined by an outer wall and an inner wall, the combination comprising, a torque box structure extending transversely of the vehicle between the rail structure and the rocker structure and including forward and rearward walls joined by upper and lower walls defining a hollow enclosure extending transversely of the vehicle and opening outwardly to the inner wall

of the rocker structure and inwardly to the rail structure, means securing the torque box walls to the rocker structure and to the rail structure so that the torque box walls pass impact loads from the rail structure to the rocker structure, and, an elongated tension member extending transversely of



the vehicle through the torque box structure and the rocker structure and having the inner end thereof secured to at least one wall of the torque box structure and the outer end thereof secured to at least one wall of the rocker structure to reinforce the means securing the torque box walls to the rocker structure and prevent failure thereof.

4,673,206

MOTOR VEHICLE WITH AN AIR GUIDANCE DEVICE ARRANGED IN THE BODY

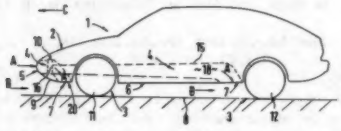
Helmut Kretschmer, Bessenbach, and Manfred Hochkoenig, Moeglingen, both of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Fed. Rep. of Germany

Filed Aug. 27, 1986, Ser. No. 900,215

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1985, 3530494

Int. Cl.[4] B62D *37/02*

U.S. Cl. 296—1 S **18 Claims**



1. A motor vehicle comprising air guidance means for a first air stream arranged on the body, the first air stream reaching the air guidance means by way of inlet opening means and leaving the air guidance means by way of a discharge opening means provided in the vehicle underside, the first air stream being combined with a second air stream that flows through the space between the vehicle underside and the road surface, the discharge opening means being provided on a cover means of the vehicle underside directly ahead of and exclusively within the area of vehicle wheels, means on the inside of the air guidance means for reducing the flow velocity of the first air stream so that the first air stream has a smaller kinetic energy within the area of the discharge opening means that the second air stream flowing between the vehicle underside and the road surface.

4,673,207

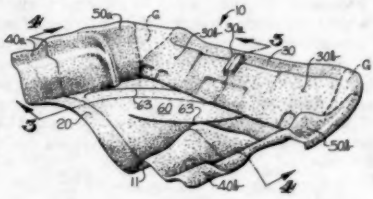
ONE-PIECE AUTOMOTIVE TRUNK LINER

David P. Reynolds, Charlotte; John D. Shepard, Marion, and Samuel L. Stone, Jr., Old Fort, all of N.C., assignors to Collins & Aikman, Albemarle, N.C.

Filed Oct. 14, 1986, Ser. No. 918,515

Int. Cl.[4] B62D *25/00*

U.S. Cl. 296—39 R **25 Claims**



1. A one-piece trunk liner for an automobile trunk compartment, said trunk liner comprising an integral molded relatively stiff fibrous body having a center floor cover panel, and a plurality of panels extending along the sides of said center floor cover panel and integrally connected thereto, said plurality of panels extending upwardly and outwardly from said center floor cover panel so as to be in outwardly diverging relation to said center floor cover panel, said stiffness of said molded fibrous body and the outwardly diverging relationship of said plurality of panels causing said panels to resiliently engage inner wall surfaces of the trunk when the panels are biased inwardly toward an upright position when mounted in the trunk to thereby facilitate mounting the trunk liner in the trunk of the automobile and maintaining the trunk liner in the installed position in engagement with the walls of the trunk.

4,673,208

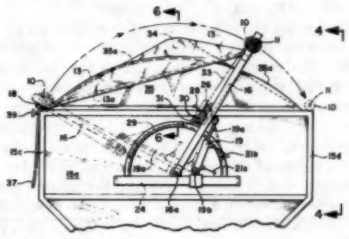
POWER-OPERATED, EXTENDIBLE AND RETRACTIBLE COVER FOR TRUCK BEDS

Masa Tsukamoto, 99 West 1000 North, Blackfoot, Id. 83221

Filed Jan. 2, 1986, Ser. No. 815,820

Int. Cl.[4] B60P *7/04*

U.S. Cl. 296—98 **12 Claims**



1. Apparatus for attachment to an automotive truck for extending and retracting a flexible cover sheet over the truck bed, comprising a spring-biased roller of length substantially equivalent to the length of the truck bed and having rolled thereon a flexible cover sheet for the truck bed; a pair of elongate levers, the levers of which are adapted for pivotal attachment at one set of ends thereof to said truck substantially midway of respective opposite ends of the truck bed, the opposite set of ends of said levers being adapted to have opposite ends of said roller rotatably attached thereto, the free end of said cover sheet being attachable to and along one side of the truck bed; reciprocating power means adapted to be connected

to said levers intermediate the lengths thereof for moving said levers in unison to move the roller back and forth transversely across the truck bed, said power means being adapted for connection with a power source carried by the truck; drive mechanism for the roller adapted to be positioned between at least one of said levers and a corresponding end wall of the truck bed for positively rotating said roller as it is moved back and forth over the truck bed, said mechanism comprising a pair of spaced-apart wheels rotatably carried by the said at least one lever intermediate its ends; an arcuate guide track adapted to be attached to the truck; a length of flexible connector adapted to be trained over said track and reversely over said pair of wheels and attached at its ends to said truck; a drive wheel having a rotatable axis in common with one of said pair of wheels and fixidly connected thereto for rotation therewith; a second drive wheel affixed to said roller; and a closed loop of flexible connector adapted to be trained around said drive wheels.

4,673,209

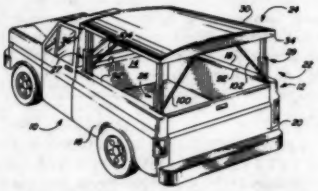
COVER ASSEMBLY FOR PICKUP TRUCK BED

Hassan Rafi-Zadeh, 5301 E. Mockingbird La., Paradise Valley, Ariz. 85253

Continuation-in-part of Ser. No. 801,288, Nov. 25, 1985, Pat. No. 4,613,181. This application Sep. 15, 1986, Ser. No. 907,605

Int. Cl.[4] B60J *7/08*

U.S. Cl. 296—100 **7 Claims**



1. A vertically extensible cover assembly for use on the bed of a pickup truck comprising in combination:

(a) a rigid cover of rectangular configuration;

(b) four folding arms each dependingly mounted at a different one of the corners of said cover;

(c) four separate one piece mounting brackets each pivotably mounted on the lower end of different ones of said folding arms for attachment to the upper ledges of the pickup truck bed at different corners thereof, said mounting brackets being selectively mounted on their respective ones of said folding arms in a first position wherein they are disposed for being mounted in an overlaying position on the ledges of the pickup truck bed when the ledges are relatively wide, and in a second position rotated about the axis wherein they are disposed for being mounted in an inwardly extending position on the ledges of pickup truck beds when the ledges are relatively narrow;

(d) each of said folding arms having a folded position wherein said cover is in a lowered position on the pickup bed when said mounting brackets are mounted thereon and having an unfolded extending position wherein said cover is elevated relative to the pickup truck bed when said mounting brackets are mounted thereon; and

(e) transverse stabilizing means connected between the lower ends of said folding arms and the front and rear depending panels of said cover for stabilizing the cover in its elevated position against lateral displacement relative to the longitudinal dimension of the pickup truck when said mounting brackets are mounted on the bed thereof.

4,673,210

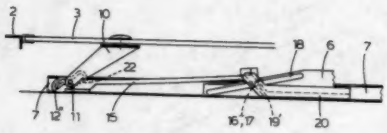
OPEN ROOF CONSTRUCTION FOR A VEHICLE

Robert T. Boots, Haarlem, Netherlands, assignor to Vermeulen-Hollandia Octrooien II B.V., Netherlands

Filed Sep. 10, 1985, Ser. No. 774,458

Int. Cl.[4] B60J *7/05, 7/053*

U.S. Cl. 296—221 **13 Claims**



1. An open roof construction for a vehicle with a roof opening, said vehicle having a longitudinal direction, comprising a panel having a forward edge and having at least a first closed position closing the roof opening, the panel being movable from the closed position to a second open tilted position and back to the first closed position;

said panel being movable between said first and second positions while the forward edge of the panel remains substantially in a foremost position adjacent a front of the opening;

a stationary guide with a substantially horizontal rail extending in a longitudinal direction of the vehicle;

a slidable element for displacing the panel, the slidable element being driven by a push-pull means and being guided in the substantially horizontal rail of the stationary guide; and

support means for supporting a front side of the panel and being adapted to adjust the height of the forward edge of the panel when the panel is moved from and to its first closed position, the support means being slidably guided in the substantially horizontal rail of the stationary guide and being engaged within both the slidable element and the stationary guide in such manner that when the slidable element is displaced along the horizontal rail while the panel is in the foremost position the support means moves longitudinally along the horizontal rail and relatively with respect to both the slidable element and the stationary guide.

4,673,211

LIGHTWEIGHT COMPACT CHAIR WITH BACK SUPPORT, FOR OUTDOORS USE

Timothy C. Hoffman, 104 44th St., Manhattan Beach, Calif. 90266

Filed Mar. 6, 1986, Ser. No. 836,700

Int. Cl.[4] A47C *4/00*

U.S. Cl. 297—16 **5 Claims**

1. A light weight compact chair device comprising: a sling; a backrest; a rear support member; a T-section member which fits into said rear support member, providing support for said backrest and said sling; a right front support member and a left front support member; means connecting the rear support member to the right front support member and the left front support member to form a rigid stable frame which is capable of supporting the sling and a person sitting thereon; said means including a bracket support mechanism which, when connected to the rear support member and the right front and left front support members, allows the three support members to be either locked in use position as a frame, or folded together in substantial alignment to make a lightweight, compact carrying package; wherein the bracket support mechanism comprises

(a) a right bracket support;

(b) a left bracket support;

(c) a center bracket support;

(d) two fastening screws; and

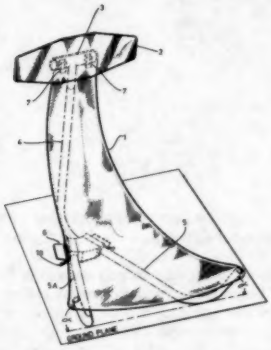
(e) two bracket release assemblies;

said right bracket support, left bracket support and center bracket support being pivotably connected together by said fastening screws, and held rigid by said bracket release assemblies, forming a common plane with the floor or ground;

said bracket support mechanism being designed so that finger pressure applied to said bracket release assemblies, allow the folding back of said right front and left front support members to be in substantial parallel alignment with said rear support member;

said bracket support mechanism being designed so that when assembled into the use position, said rear support member and said right front and left front support members ensure a firm base on the ground;

said center bracket support being approximately hexagonal in shape and having a hole bored axially in it to accomodate said rear support member said center bracket support having two tapped holes located in opposite sides to receive said fastening screws, and two socket holes located on opposite sides to receive the pin heads of said bracket release assemblies;



said right bracket support and left bracket support being rectangular in shape and identical, except for the mirror image location of holes for said bracket release assembly; each said right and left bracket support having a hole bored axially in it to accomodate said right front support member or left front support member, and having two holes passing transversely through the block section to accomodate said fastening screw and said bracket release assembly;

said bracket support mechanism being made of a light weight material such as aluminum or a suitably molded plastic.

4,673,212

CYCLE SEAT

William J. Mayer, Fall River Mills, Calif., assignor to Don L. Russell and Donna J. Russell, both of Fall River Mills, Calif.

Filed Jul. 28, 1986, Ser. No. 891,275

Int. Cl.[4] B62J *1/00*

U.S. Cl. 297—195 **9 Claims**

1. A seat structure for use with cycle seats, comprising:

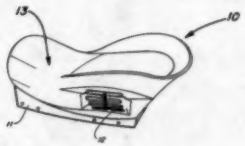
a base having a front end, a rear end, a left side, a right side, a top surface and a bottom surface and at least one slot near said left side and at least one slot near said right side;

a pair of lateral wings extending upward from said top surface of said base and laterally over said right side and said left side of said base;

spring means supporting each of said lateral wings and resisting laterally outward and downward forces, said spring means being attached to said base and having free ends extending outward therefrom in each of said lateral wings;

strap means attached proximate to said free ends of said spring means and extending above said spring means and through said slots in said base, and

adjustment means consisting substantially of:



a plate pivotally attached to said base;

locking means for holding said plate in position, and

attaching means attaching said plate to said strap means whereby tension on said strap means changes as said plate is rotated with respect to said base.

4,673,213

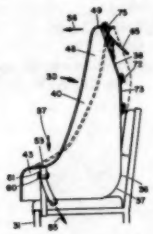
POSTURE ALIGNMENT SEAT SHELL

Richard D. Bushey, 3521 16th Ave., Kenosha, Wis. 53140, and Dennis J. Bushey, 833 Teutonia, Burlington, Wis. 53105

Filed Feb. 5, 1986, Ser. No. 826,302

Int. Cl.[4] A47C *3/00*

U.S. Cl. 297—284 **13 Claims**



1. A seat shell for supporting a person seated thereon comprising:

a generally horizontal seat portion;

an upstanding back portion;

said seat portion and said back portion being formed from resilient material and defining an integral unit;

said upstanding back portion including a lower bakc part joining said upstanding back portion to the rear of said seat portion, an upper back part above said lower back part, and lateral side parts, one at opposite sides of said upstanding back portion and extending forwardly therefrom; and,

adjusting strap means extending between said upper and lower back parts for pulling a top segment of said upper part downward relative to the remainder of the back portion to deform said upper back part into a head and neck support and for securing same in selected deformed position, whereby the height of the head and neck support is adjustable.

4,673,214

HEAD SUPPORT FOR A SEAT BACKREST

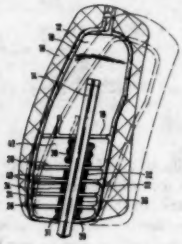
Hermann Meiller, Amberg, Fed. Rep. of Germany, assignor to Grammer Sitzsysteme GmbH, Fed. Rep. of Germany

Filed Jul. 31, 1986, Ser. No. 891,155

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1985, 3530687

Int. Cl.[4] A47C 7/36

U.S. Cl. 297—408 10 Claims



1. A head support for the backrest portion of a seat, comprising at least one elongate mounting member adapted to be mounted to said backrest portion and a head support member having a cavity therein, into which said mounting member projects, wherein, for the purposes of adjustment of the angle of inclination of the head support member, at least one flexible element is disposed on said mounting member around same, and extending within said cavity in parallel relationship to the plane of said pivotal adjustment movement are first and second vertical spaced-apart wall portions with which said element is in friction engagement.

4,673,215

SEAT FRAME FOR AUTOMOBILE SEATS

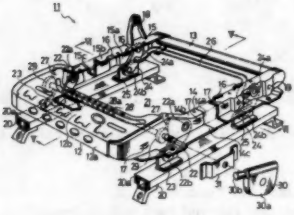
Shoh Yokoyama, Akishima, Japan, assignor to Tachikawa Spring Co., Ltd., Tokyo, Japan

Filed Apr. 9, 1986, Ser. No. 849,941

Claims priority, application Japan, Apr. 9, 1985, 60-52655[U]

Int. Cl.[4] A47C 7/02

U.S. Cl. 297—452 2 Claims



1. A seat frame comprising:

first and second side frame members each comprising a vertically extending web, an upper flange element integrally formed on an upper edge of said web and a lower flange element integrally formed along a lower edge of said web, said upper and lower flanges projecting horizontally in opposite directions from said web;

a front frame member welded to a forward end of each of said side frame members, said front frame member having a channel-shaped configuration and including an upper flange and a lower flange, said upper flange of said front frame member being longer than said lower flange of said front frame member; and

a rear frame member welded to a rearward end of each of said side frame members.

4,673,216

BASIC LOTUS POSTURE COMFORT SEAT

Jaroslaw G. Alfer, 350 S. Figueroa St., Ste. 117 - 752, Los Angeles, Calif. 90071

Continuation-in-part of Ser. No. 638,053, Aug. 6, 1984, abandoned. This application May 31, 1985, Ser. No. 739,530

Int. Cl.[4] A47C 7/02

U.S. Cl. 297—452 2 Claims

1. A seat for the support and positioning of legs and knees and feet of persons sitting in a cross-legged posture, and including;

a substantially horseshoe-shaped support of flexible material and of bilaterally symetrical configuration with horizontally parallel top and bottom surfaces and comprised of opposite side sections and each with a buttock support portion and a forwardly projecting pier support for an upper leg,

the piers of the opposite side sections being separated one from the other by a transverse front of the buttock portions to accomodate a heel of the person's feet and forwardly and laterally divergent and separated by an unobstructed space therebetween and each having an inner face to engage and position a plantar surface of the person's foot, and alternately under which a portion of the person's foot can be lodged,

a central nose projecting forwardly from the transverse front of the buttock support portions of the side sections and stopping short of the person's crossed lower legs and extending between the divergent piers for stabilizing of the buttock support portions,

and the buttock support portions of the side section and upper leg supporting piers extending therefrom having coplanar top surfaces for the support of the buttocks and upper legs in a raised horizontal condition and with the lower legs extending cross-legged and freely into and across the unobstructed space between the piers.

4,673,217

BELT ANCHOR INCORPORATING A SEAT TRACK STRUCTURE

Yuji Nishiyama; Tateo Kitano, and Masakazu Hashimoto, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Sep. 12, 1986, Ser. No. 906,308

Claims priority, application Japan, Sep. 20, 1985, 60-143584[U]

Int. Cl.[4] A62B 35/02

U.S. Cl. 297—473 20 Claims

1. A belt anchor incorporating a seat track structure for a vehicle designed to support a seat on the body of the vehicle in such a manner that said seat is movable in the longitudinal direction of the vehicle, comprising:

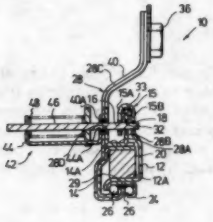
a seat track having a lower rail rigidly secured to the vehicle body, and an upper rail movable along said lower rail in the longitudinal direction of the vehicle through first and second rotary support means;

a belt anchor rigidly secured to said upper rail;

a reinforcement member rigidly secured to the seat and said upper rail as well as to said belt anchor for reinforcing the strength of these members;

a guide plate rigidly secured to a first edge portion of said lower rail in such a manner as to retain said second rotary support means between said guide plate and a first edge portion of said upper rail and to prevent said first edge portion of said lower rail and said first edge portion of said upper rail from moving relative to each other in the lateral direction of the vehicle;

a slide member disposed in a space defined between a sub-



stantially U-shaped bent portion formed at a second edge portion of said lower rail, a first edge portion of said belt anchor being positioned within said bent portion, so as to prevent said belt anchor and said bent portion from moving relative to each other in the lateral direction of the vehicle;

retaining means supported by said reinforcement member and adapted to be selectively received through a plurality of bores formed in the lower rail at predetermined spacings along the longitudinal direction of the vehicle for retaining said seat at a given position; and

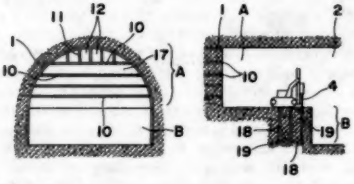
whereby a load which acts on said belt anchor when a emergency situation occurs is transmitted to said lower rail through said retaining means, and said lower and upper rails are prevented from moving relative to each other in the lateral direction of the vehicle by virtue of said slide member and said guide plate.

4,673,218

TUNNEL EXCAVATION METHOD

Susumu Murakami, Sakai, and Hiroo Honda, Osaka, both of Japan, assignors to Okumura Corporation, Osaka, Japan

Filed Oct. 18, 1985, Ser. No. 789,017
Int. Cl.[4] E21C *41/00*
U.S. Cl. 299—15 **9 Claims**



1. A method of excavating a tunnel in bedrock, comprising the steps of:

boring an outer peripheral slot in said bedrock along an outer periphery of a cross section of said tunnel

boring in an upper half portion of said periphery a plurality of horizontal slots spaced vertically a first predetermined distance from each other such that said upper half of said periphery is divided into a plurality of bedrock portions by said horizontal slots;

boring a plurality of first vertical slots in one of said bedrock portions such that said one of said bedrock portions is divided into a plurality of first bedrock blocks by said first vertical slots;

removing said first bedrock blocks from said bedrock so as to define a working space;

providing an excavator in said working space such that remaining bedrock portions are excavated for removal sequentially so that said upper half portion of said periphery is excavated to a predetermined length so as to define an upper excavated space;

boring in a lower half portion of said periphery from said upper excavated space a plurality of second vertical slots extending substantially at right angles to the direction of excavation of said tunnel and spaced a second predetermined distance from each other in said direction of excavation of said tunnel such that said lower half portion of said periphery is divided into a plurality of second bedrock blocks by said second vertical slots; and

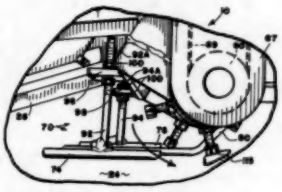
removing said second bedrock blocks sequentially from said bedrock such that said lower half portion of said periphery is excavated to said predetermined length.

4,673,219

POWER DRIVEN ROOFING REMOVAL TOOL

David D. Percifal, Jonesboro, Ark., assignor to J. T. Barr, Jonesboro and Keith Doty, Mountain Home, both of, Ark.

Filed Nov. 26, 1985, Ser. No. 801,867
Int. Cl.[4] E04D *15/02*
U.S. Cl. 299—39 **2 Claims**



1. A power tool for removing roofing such as shingles or the like from roofs, the tool comprising:

rigid frame means adapted to be manually manipulated by a user of said tool during shingle removal, said frame means having a front, a rear, a bottom and sides;

drum means for forcibly removing said shingles, said drum means rotatably coupled to said frame means at the front thereof, the drum means comprising a rigid cylinder having an outer surface including a plurality of spaced apart teeth disposed about said outer surface and projecting outwardly therefrom for cutting shingles to be removed in response to drum rotation, wherein said drum means teeth may be selectively adjusted in length as desired by the user of said tool by screwing them inwardly or outwardly with respect to said drum means;

motor means supported by said frame means for selectively actuating said drum means;

sled means coupled to said frame means for supporting said frame means above said roof and for facilitating movement of said tool over said roof, said sled means comprising:

a pair of rigid, parallel, spaced apart end rails disposed in slidable roof-engaging contact generally horizontally upon opposite bottom sides of said frame means;

a rigid center rail having a portion thereof disposed between said end rails and an integral fromt portion thereof extending about the front of said frame means in front of and under said drum means to guard same; and,

user adjustable vertical rail portions extending upwardly from said horizontal end rails and threadably adjustably coupled to said frame means, whereby the elevation of said drum means may be varied by selectively adjusting said sled means;

handle means operatively associated with the rear of said frame means for permitting manual manipulation of said tool by a user;

wheel means associated with said frame means rear for enabling the user to maneuver said tool substantially independently of said sled means; and,

guard means pivotally associated with said frame means front for protectively covering said drum means during operation of said tool and for safely permitting concurrent visual inspection of said drum means.

4,673,220

BRAKE PRESSURE CONTROL VALVE ASSEMBLY HAVING A BYPASS FUNCTION

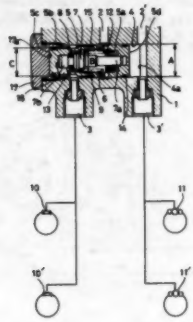
Teruhisa Kohno; Seiji Nokubo, and Akio Matsuoka, all of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Sep. 19, 1985, Ser. No. 777,625

Claims priority, application Japan, Oct. 17, 1984, 59-218945; Dec. 21, 1984, 59-194871[U]; Dec. 21, 1984, 59-194872[U]

Int. Cl.[4] B60T *8/26*

U.S. Cl. 303—6 C **15 Claims**



1. A brake pressure control valve assembly having a bypass function for use in a dual brake fluid circuit, said assembly comprising a body formed with a bore, a pair of inlets intersecting said bore and a pair of outlets intersecting said bore, a piston slidably mounted in said bore so as to be responsive to fluid pressures from two brake fluid circuits, a pressure reducing valve supported within said piston for reducing the pressure of one of said two brake fluid circuits, said piston being responsive to pressure differences between said circuits for movement toward said one circuit to disable said pressure reducing valve from reducing the pressure of the other of said two circuits.

4,673,221

BRAKING SYSTEM FOR VEHICLES

Tsutomu Hayashi, Tokyo; Takeshi Kawaguchi, and Tetsuo Tsuchida, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 6, 1985, Ser. No. 741,904

Claims priority, application Japan, Jun. 7, 1984, 59-117282

Int. Cl.[4] B60T *8/02*

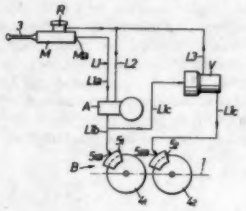
U.S. Cl. 303—6 R **11 Claims**

1. A braking system for the wheel of a vehicle, comprising a brake having two brake calipers;

a master cylinder;

hydraulic coupling between said two brake calipers and said master cylinder;

an antilock modulator assembly in said hydraulic coupling and having a hydraulic chamber and a first spring biased piston therein creating a residual pressure in said hydraulic coupling during modulation;



a valve in said hydraulic coupling to one of said brake calipers, said valve having an output hydraulic chamber, a second spring biased valve piston therein and a relief port controlled by said second valve piston, said second spring biased valve piston closing said relief port at a hydraulic pressure in said hydraulic coupling above said residual pressure.

4,673,222

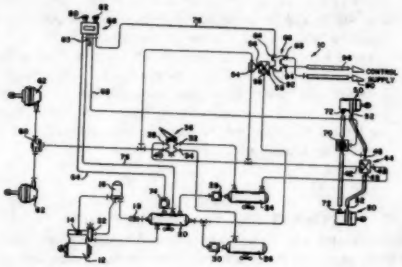
TRACTOR AIR PRESSURE BRAKING SYSTEM

David J. Knight, Avon Lake, Ohio, assignor to Allied Corporation, Morristown, N.J.

Filed Jan. 31, 1986, Ser. No. 824,749

Int. Cl.[4] B60T *13/00*

U.S. Cl. 303—9 **8 Claims**



1. Fluid pressure braking system comprising first and second sets of fluid pressure operated service brakes, a set of fluid pressure responsive emergency brakes, a fluid pressure source, a supply reservoir communicated with said fluid pressure source, a pair of service reservoirs, first and second conduits separately communicating each of said service reservoirs with said supply reservoir, first and second pressure protection valves located in said conduits for preventing pressure communication from said supply reservoir into said service reservoirs until the pressure level in said supply reservoir attains a predetermined level, and means for communicating each of said service reservoirs with a corresponding set of said service brakes, said communicating means including operator-actuated valve means for substantially simultaneously communicating said first and second sets of service brakes with their corresponding service reservoirs, third conduit means for communicating said supply reservoir with said emergency brakes, said third conduit means being independent and separate from both of said service reservoirs and said first and second pressure protection valves, and a third pressure protection valve in said

third conduit for preventing communication from said supply reservoir to said emergency brakes until the pressure level in said supply reservoir attains a predetermined level, the pressure level at which said first and second pressure protection valves initiate communication between said supply reservoir and said service reservoirs being less than the pressure level at which said third pressure protection valve initiates communication with said emergency brakes.

4,673,223

DECELERATION RESPONSIVE BRAKING CORRECTOR

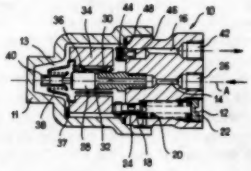
Jean-Jacques Carre, Le Rainey, and Roland Levrai, Stains, both of France, assignors to Bendix France, Paris, France

Filed Nov. 20, 1985, Ser. No. 800,173

Claims priority, application France, Nov. 21, 1984, 84 17728; Jun. 20, 1985, 85 09369

Int. Cl.[4] B60T *8/28, 8/14*

U.S. Cl. 303—24 C **17 Claims**



1. A deceleration-responsive braking corrector for the braking system of a vehicle, comprising a body defining a chamber, an inlet port to be connected to a source of fluid pressure, an outlet port connected with the chamber and intended to be connected with brakes of the vehicle, a passage between the ports and communicating with the chamber, a mass mounted slidably in the chamber and responsive to deceleration of the vehicle, valve means capable of cooperating with the mass to close the passage between the ports when the mass moves under the effect of the deceleration of the vehicle, first spring means normally urging the mass in one direction toward a rest position and opening the passage between the ports, and second spring means disposed within the body, characterized in that the first spring means and second spring means both urge the mass in the one direction toward the rest position and opening the passage, the body including a bore having a piston disposed slidably therein, the piston having a seal thereabout and biased by the second spring means into engagement with the mass, and the mass mounted slidably on a shaft having therein an opening, the opening forming a part of the passage between the ports.

4,673,224

BRAKE PRESSURE CONTROL UNIT

Ernst Schmoelzer, Frankfurt am Main, Fed. Rep. of Germany, assignor to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 12, 1985, Ser. No. 796,858

Claims priority, application Fed. Rep. of Germany, Nov. 16, 1984, 3441964

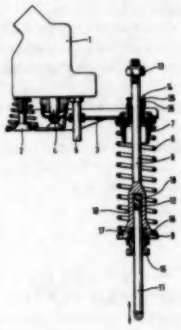
Int. Cl.[4] B60T *17/00, 8/18*

U.S. Cl. 303—56 **12 Claims**

1. A brake pressure control unit for a hydraulic fluid actuatable vehicle brake system of the type having a spring device for sensing vehicle load mounted to a vehicle member for instantaneously translating said vehicle load to a brake pressure control unit mounted to a spring member of the vehicle having at least one valve with a control piston being pressure sensitively slidable in a closure direction against a force of said spring device transmitted thereto through a swivelling transmission lever mounted between said spring device and said control piston comprising:

a pilot device including a first element affixed to an unsprung vehicle member; a second pilot element operatively connected to said transmission lever, through said spring device and a spring disposed between said first and said second pilot element;

means for temporarily rigidly connecting said first pilot element to said second pilot element to form a constructional unit having a predetermined length related to a predetermined load condition of said vehicle; and



means associated with said pilot device and said spring device for adjusting said spring device to exert a force on said transmission lever corresponding to said predetermined load condition of said vehicle, thereby defining a predetermined pressure change over position of said valve, said pilot device having said predetermined length with said spring device adjusted to said predetermined load condition.

4,673,225

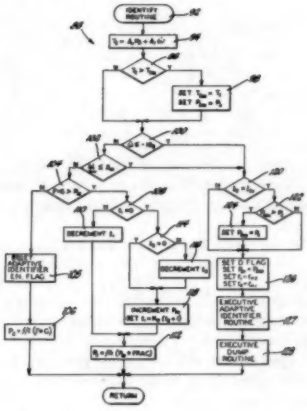
ANTI-LOCK BRAKE CONTROL SYSTEM

Alexander Kade, Grosse Pointe Woods, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 10, 1986, Ser. No. 827,507

Int. Cl.[4] B60T *8/60, 8/66*

U.S. Cl. 303—100 **4 Claims**



4. The method of limiting the brake pressure applied to the brakes of a vehicle wheel comprising the steps of:

estimating the tire torque tending to accelerate the wheel

during the application of brake pressure in response to predetermined parameters;

cyclically (A) storing the value of brake pressure corresponding in time to the maximum tire torque monitored following each application of brake pressure, (B) detecting an incipient wheel lockup condition, (C) dumping the brake pressure to allow recovery from the detected incipient wheel lockup condition, (D) reapplying the brake pressure following a detected incipient wheel lockup condition to substantially the value of the last stored value of brake pressure and (E) ramping the brake pressure until an incipient wheel lockup condition is detected;

timing each cycle of storing, detecting, dumping and reapplying; and

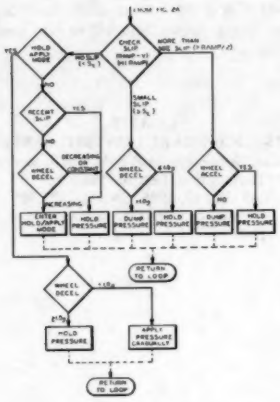
adjusting the estimation response to the predetermined parameters in a sense tending to maintain the time of each cycle within a predetermined range representing a stored value of brake pressure establishing substantially the actual maximum tire torque.

4,673,226

VEHICLE SKID CONTROL SYSTEM

Peter Every, Livonia; Thomas M. Atkins; Roger L. Miller, both of Ann Arbor, all of Mich., and Leonard T. Tribe, Seal Beach, Calif., assignors to Kelsey-Hayes Company, Romulus, Mich.

Filed Feb. 19, 1985, Ser. No. 702,765
Int. Cl.[4] B60T *8/66*
U.S. Cl. 303—109 **50 Claims**



43. A method of braking at least one wheel of a multi-wheeled vehicle having means for supplying pressurized brake fluid to actuate a selected wheel brake, said method comprising the steps of:

(a) supplying brake fluid at an increasing pressure to actuate the selected wheel brake and decelerate the associated wheel;

(b) holding fluid pressure to the selected wheel brake at a relatively constant level after a wheel lock-up condition of the associated wheel is detected;

(c) subseqent to step (b), selectively reducing fluid pressure to the selected wheel brake to correct the wheel lock-up condition; and

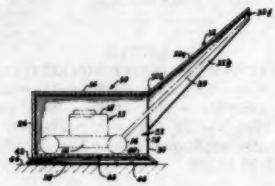
(d) subseqent to step (c), selectively increasing fluid pressure to the selected wheel brake when the rate of change of deceleration of the associated wheel increases by a first predetermined amount.

4,673,227

ENCLOSURE CABINET FOR OUTDOOR-USE DEVICES

Daryl R. Anderson, E. Main St., Crawfordsville, Ind. 47933

Filed Oct. 1, 1985, Ser. No. 782,478
Int. Cl.[4] A47B *81/00*
U.S. Cl. 312—100 **10 Claims**



1. An enclosure cabinet for enclosing a lawn mower whose components include ground-engaging wheels, cutting means, and power means, and the lawn mower also has a handle which extends upwardly and rearwardly of the lawn mower, the cabinet comprising:

a pair of side walls, a rear wall which interconnects the rear end portions of the side walls, and a cover means which extends between the side walls and extends forwardly from the rear wall to front end portions of the side walls,

the front end portions of the side walls having an opening therebetween, and permitting ingress and egress of the said lawn mower components through the opening between the side walls for storage,

a handle cover for shielding the handle of the lawn mower, the handle cover extending transversely of the cabinet at least substantially as far as the spacing of the side walls and at least substantially as far as the length of the opening between the side walls, and

support means which support the handle cover from the enclosure cabinet in a position extending upwardly and forwardly therefrom although upwardly and rearwardly of the lawn mower, said support means being wholly supported by the enclosure cabinet and supporting the handle cover in the absense of any leg means extending downwardly from a forward portion of the handle cover for support thereof from the ground.

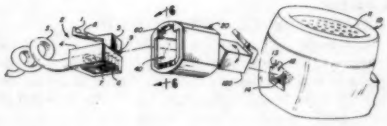
the arrangement of the enclosure cabinet and the handle cover providing a shielding enclosure for the lawn mower's said components and handle, while the handle is operatively assembled to the mower having its said set of components.

4,673,228

ROTARY ELECTRICAL CONNECTOR APPARATUS

Albert Ditzig, Hoffman Estates, Ill., assignor to Telephone Products, Inc., Wheeling, Ill.

Filed Dec. 16, 1985, Ser. No. 809,217
Int. Cl.[4] H01R *39/00*
U.S. Cl. 439—21 **31 Claims**



1. A spindle, composed of non-conducting material, for use with electrical conducting means for receiving and transmitting electrical energy, said spindle having an axis and comprising:

a pair of members each having an outer surface and an inner surface;

said members extending in an axial direction alongside each other;

one member being mounted on the other member to form said spindle;

a first end portion and a second end portion axially spaced on said spindle;

a first spindle section and a second spindle section in axially aligned relation on said spindle;

each spindle section having an outer surface defined by both outer surfaces of said two members which form the spindle;

said first spindle section having a circular cross sectional area; and,

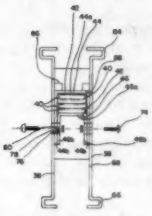
means on said outer surface of the first spindle section for holding a part of said electrical conducting means, and means on said inner surfaces of the two members cooperating to hold another part of said electrical conducting means, to transmit electrical energy through said first and second spindle sections.

4,673,229

ELECTRICAL DISTRIBUTION SYSTEM WITH AN IMPROVED HOUSING

George N. Jorgensen, Oxford; Gilbert A. McGoldrick, Hamilton, both of Ohio, and Allan E. Slicer, Brookville, Ind., assignors to Square D Company, Palatine, Ill.

Filed Sep. 13, 1984, Ser. No. 650,377
Int. Cl.[4] H01R *13/60*
U.S. Cl. 439—207 **11 Claims**



1. A busway section comprising:

a pair of longitudinally extending electrically grounded side rails;

a plurality of longitudinally extending main phase bus bars intermediate said grounded side rails;

a ground bus for supporting said main phase bus bars between said ground side rails, said grounded bus having a generally U-shaped upper section, the upper section including a top portion with a first pair of generally parallel depending side flanges, and a lower section including a bottom portion with a second pair of generally parallel depending side flanges, said lower section located between said first pair of side flanges, each of said first pair side flanges including a portion located intermediate and in engagement with a respective one of said second pair side flanges and a respective grounded side rail, said main phase bus bars positioned intermediate said top portion and said bottom portion and intermediate said first pair of side flanges: insulating means for insulating each of said main phase bus bars; and

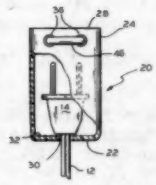
connecting means for mechanically and electrically connecting each said grounded side rail to said ground bus.

4,673,230

SECURITY DEVICE FOR ELECTRICAL PLUG

Herbert P. Baumgart, 1604 N. 9th Ave., Melrose Park, Ill. 60160

Filed Mar. 28, 1986, Ser. No. 845,186
Int. Cl.[4] H01R *13/44*
U.S. Cl. 439—133 **6 Claims**



1. An apparatus for preventing the unauthorized use of an electrical device, the electrical device including an electrical conduit attached at one end to the electrical device, and its other end to an electrical plug, the apparatus comprising:

an enclosure having a bottom and a side wall affording an inner chamber, the enclosure having an open top portion through which the electrical plug can be passed for positioning in the chamber, the bottom of the enclosure having an aperture for slidably receiving the conduit, said aperture being smaller in size than the electrical plug and the electrical device so that the conduit extends longitudinally through the aperture and enclosure to retain the enclosure on the conduit between the plug and the electrical device;

aperture means on opposite sides of the top portion of the enclosure; and

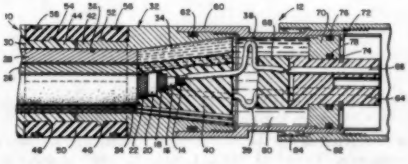
a removable lock provided with a locking mechanism and a shackle, the shackle being selectively movable with respect to the locking mechanism between locked and unlocked positions, the shackle being of a size to pass through said aperture means to limit the size of said open top portion and to capture the electrical plug within the enclosure when the shackle is moved to locked position.

4,673,231

UNDERWATER ELECTRIC CABLE TENSION TERMINATION

John A. McAnulty, Sr., Pasadena, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Feb. 4, 1986, Ser. No. 825,729
Int. Cl.[4] H01R *11/00*
U.S. Cl. 439—587 **18 Claims**



1. A cable termination for a cable having at least one electric conductor therein, a tension member in addition to the conductor and a flexible cable sheath around the tension member, comprising:

a cup body, a cylindrical surface within said cup body sized to receive the tension member of the cable when the cable sheath is removed, said cup body having therein a conical cup surface adjoining said cylindrical surface and conically enlarging therefrom toward a coupling end of said body so that the tension member of the cable can be expanded in the conical cup defined by said conical cup

surface and a plug can be formed within the expanded tension member, said cylindrical surface and said conical cup surface being smooth so that the tension member and plug can slide therein to compress in said cup; and

a flexible sleeve connected to and sealed with respect to said cup body and for connection and sealing with respect to the cable sheath so that as the cable moves with respect to said cup body, said flexible sheath stretches to maintain sealing between said cup body and the cable sheath.

4,673,232

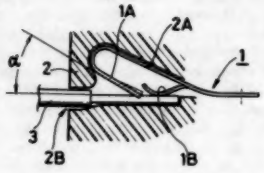
PUSH-IN TERMINAL SYSTEM

Teruo Kubota, and Takashi Tasaki, both of Utsunomiya, Japan, assignors to Yamato Denki Co., Ltd., Tokyo, Japan

Filed Dec. 31, 1985, Ser. No. 814,955

Int. Cl.[4] H01R *4/24*

U.S. Cl. 439—441 **5 Claims**



1. A terminal used for connecting a cable to an electric wiring system comprising:

(a) a case communicating with an electric wiring system and including an inner chamber having a cable hole leading to the exterior and an inner wiring hole leading to a source of electricity;

(b) a unitary spring biased conducting plate seated in said case intemediate said cable hole and said wiring hole, further including:

(i) a curvate middle portion seated against the top of said chamber;

(ii) a cable connecting portion extending downwardly and inclined inwardly of said cable hole so as to lockingly engage a cable inserted in said cable hole;

(iii) an electrical contact portion extending inwardly of said wiring system hole and towards said cable connecting portion so as to engage a cable inserted in said cable hole; and

(iv) an end portion extending from said electrica contact portion through said wiring hole to a source of electricity.

4,673,233

WATERPROOF SPLICE CONNECTOR HAVING HIGH TENSILE PULLOUT RESISTANCE

Chris E. Hertelendy, 3364 Newburg Rd., Louisville, Ky. 40218

Continuation of Ser. No. 801,461, Nov. 25, 1985, abandoned. This application Sep. 25, 1986, Ser. No. 912,211

Int. Cl.[4] H01R *4/24*

U.S. Cl. 439—442 **8 Claims**

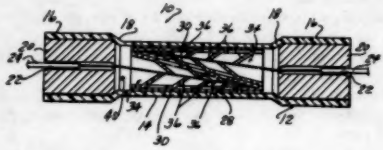
1. A splice connector for electrical leads comprising:

a tubular body of an electrically insulating material;

a sealing plug of a resilient, electrically insulating material mounted in each end of said tubular body having a central opening to receive an electrical lead;

a tubular insert mounted within said tubular body so as to receive electrical leads inserted through either end plug;

convergent oppositely directed conductive electrical lead receptacles and overlapping each other in said insert for receiving a respective electrical lead;



a plurality of barbs extending inwardly from said receptacle walls to grip and retain electrical leads inserted therein.

4,673,234

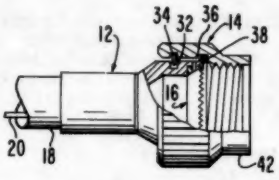
CONNECTOR/ADAPTER ASSEMBLY FOR FLEXIBLE CONDUIT OR ELECTRICAL CABLE

Milton R. Lewis, Fremont, Calif., assignor to Icore International, Inc., Sunnyvale, Calif.

Filed May 15, 1985, Ser. No. 734,637

Int. Cl.[4] H01R *13/58*

U.S. Cl. 439—469 **12 Claims**



1. A connector/adapter assembly for coupling one end of a conduit or electrical cable to a first connector having a first clocking means comprising:

a tubular adapter having a pair of opposed, open ends, one end of the adapter being adapted to receive one end of a conduit or electrical cable;

a second connector having second clocking means and adapted to be coupled to the first connector when the second clocking means is aligned with the first clocking means;

means coupled with the adapter for releasably attaching the second connector in an operative position on the adapter;

a ring rotatably mounted on said adapter; and

means carried by the adapter and coupled to the ring for limiting the rotational movement of the ring relative to the adapter, said ring permitting the second connector to move relative to the adapter when the second connector is in said operative position, whereby the second connector can be shifted relative to the first connector to compensate for misalignment between said second clocking means and said first clocking means.

4,673,235

SUBPLATE FOR A LOW-VOLTAGE ELECTRIC OUTLET

Clyde C. Conley, Tampa, Fla., assignor to Patricia R. Conley, Tampa, Fla., a part interest

Filed Jun. 19, 1986, Ser. No. 876,173

Int. Cl.[4] H02B *1/02*

U.S. Cl. 439—536 **6 Claims**

1. For use in installing a low-voltage outlet, of the type mounted onto a receptacle plate, over an opening cut in board-type wall material, the receptacle plate having a pair of screw holes spaced inward of opposite side edges,

a subplate formed of bendable sheet metal and comprising

a planar frame portion adapted to fit beneath such electric receptacle plate and having a pair of clearance holes spaced from each other a distance corresponding to the distance of such screw holes of such receptacle plate, the frame portion further having

a pair of tabs projecting inward of said clearance holes, each tab having, progressively inward from said clearance holes,

first linear means for facilitating bending therealong,

second linear means for facilitating bending parallel to and spaced from the first said means a distance substantially equal to the thickness of such wall material, and

a screw-engaging aperture spaced inward from said second linear means a distance substantially equal to the distance from said clearance hole to said first linear means, said screw-engaging aperture and said clearance hole being located along a line perpendicular to said linear means for facilitating bending, whereby on bending the tabs inwardly along said first linear means approximately 90° and backward along said second linear means approximately 90°, the screw-engaging aperture is brought into registration with the clearance hole,

each tab further having a clamping end portion extending inward beyond said screw-engaging aperture.

4,673,236

CONNECTOR ASSEMBLY

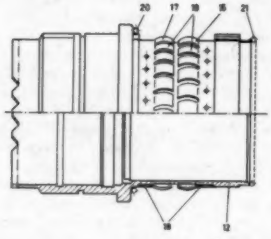
Frank Musolff, Walldorf, and Volker Sillmann, Heidelberg, both of Fed. Rep. of Germany, assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Oct. 21, 1985, Ser. No. 788,991

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1984, 8431274[U]

Int. Cl.[4] H01R *13/658*

U.S. Cl. 439—609 **2 Claims**



1. A connector assembly comprising a plug and a socket for lines shielded against electromagnetic waves and having at least one conductor, with a first, at least partially elastic ground contact ring disposed in an annular groove in the housing of either the plug or the socket and establishing a ground connection between the plug and the socket, characterized in that at least one additional ground contact ring is provided which establishes a second ground connection between the plug and the socket, said additional ground contact ring being at least partially elastic and being disposed in said annular groove and at an axial distance from said first ground contact ring, each ground contact ring being formed of a spring steel strip and having a first edge portion immovably fastened to said annular groove and a second edge portion in the form of a spring comb having spring fingers oriented radially, said spring fingers being defined by radial slots extending from said second edge portion to said first edge portion and said spring fingers having free ends, the free ends of said spring fingers of each contact ring facing the free ends of the other contact ring but being spaced therefrom and being offset in the circumferential direction such that said slots of one of said contact rings confront the free ends of said spring fingers of said other contact ring, whereby the shielding effectiveness is improved.

4,673,237

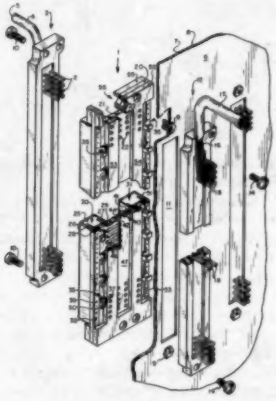
CONNECTOR FILTER ADAPTER

David L. Wadsworth, Wheaton, Ill., assignor to GTE Communication Systems Corporation, Phoenix, Ariz.

Filed Oct. 28, 1985, Ser. No. 791,818

Int. Cl.[4] H01R *4/66*

U.S. Cl. 439—607 **9 Claims**



1. A filter adapter for a connector plug including a plurality of connector pins and mounted to an inner surface of an electromagnetic interference shielding enclosure wall with said connector pins protruding through an opening in said wall, said filter adapter comprising:

a board of planar electically nonconductive construction positioned between said connector plug and said enclosure wall, said board including at least a first surface;

said board of elongated construction;

a plurality of connector pin receiving apertures formed in said board, and said apertures formed in two parallel rows extending along the elongated dimension of said board, each of said apertures engaged with a different one of said connector pins;

a plurality of electromagnetic interference reducing means each including a first terminal connected to said enclosure wall and further including a second terminal;

a plurality of conductors each positioned on said board first surface and connected between a different one of said electromagnetic interference reducing means second terminals and each connected to a distinct one of said connector plug pins;

said electromagnetic interference reducing means positioned in two parallel rows on a second surface of said board,

each of said electromagnetic reducing means positioned outward of and adjacent to said connected pin; and

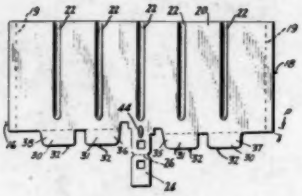
said filter adapter further including a pair of grounding strips each positioned outward of a corresponding one of said interference reducing means rows on said board first surface and connected to a corresponding one of each of said electromagnetic interference reducing means first terminals within a row, each of said grounding strips including a plurality of fingers in contact with said enclosure wall.

4,673,238

ONE-PIECE WRAP-AROUND CLAMPING SHELL FOR CIGAR LIGHTER

Brooke N. Westover, Stratford; Peter J. Lupoli, Hamden, and John J. Comerford, Stamford, all of Conn., assignors to Casco Products Corporation, Bridgeport, Conn.

Filed Oct. 4, 1985, Ser. No. 784,602
Int. Cl.[4] H01R *13/50*
U.S. Cl. 439—890 **3 Claims**



1. An all one-piece clamping shell for electric cigar lighters, comprising in combination:

(a) a rolled sheet-metal body of tubular configuration, and constituted of sheet-metal stock, said body having open ends and a reverse-bend clinched seam extending longitudinally between its ends,

(b) said body at one of its ends having a thread formation with an interruption, said thread formation being adapted for engagement with the threaded base of a cigar lighter socket, said thread formation being integral with the rolled sheet-metal body and being characterized by a diameter which is less than that of the tubular body, and

(c) a spade lug integral with said body and integral with said thread formation and constituting a portion of the same sheet metal body stock, said spade lug being disposed at the interruption of said thread formation, thereby providing an especially inexpensive, one-piece clamping shell construction.

4,673,239

TERMINAL BLOCK ASSEMBLY

John W. Smith, Indianapolis, and Ellis P. Lipp, Charlottesville, both of Ind., assignors to Emhart Industries, Inc., Indianapolis, Ind.

Continuation of Ser. No. 814,280, Dec. 23, 1985, abandoned, which is a continuation of Ser. No. 669,523, Nov. 8, 1984, abandoned. This application Aug. 27, 1986, Ser. No. 902,096
Int. Cl.[4] H01R *13/432, 13/426*
U.S. Cl. 439—746 **3 Claims**

1. A terminal block assembly comprising a terminal block,

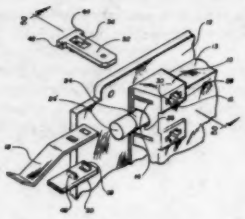
at least two intersecting slots in said terminal block,

first and second electrically conductive contact members individually carried in respective slots of said two intersecting slots,

lugs carried by each of said electrically conductive members and engaging each other, and

stop means preventing one member of said first and second electrically conductive members from moving out of its respective slot,

whereby said first and second electrically conductive members are locked together and both of said first and second



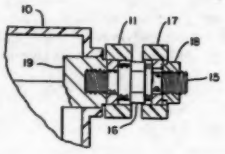
electrically conductive members are prevented from coming out of their respective slot.

4,673,240

SIDE MOUNT UNIVERSAL BATTERY TERMINAL

Dwight Byfield, Jr., 1436 N. Blackstone Ave., Fresno, Calif. 93703-3610

Filed Feb. 4, 1982, Ser. No. 345,619
Int. Cl.[4] H01R *4/30*
U.S. Cl. 439—755 **2 Claims**



1. In combination an automobile battery of the type having side mounted, threaded bolt hole terminal connectors, battery cables having bored disc shaped terminals with peripheral insulating covers and, an improved terminal connector bolt adapted to accommodate said battery cable terminals and other electrical accessory terminals comprising:

an elongated body of electrically conducting material having a longitudinal axis and an inner end and an outer end;

a first generally cylindrical threaded stud formed on the inner end of said body, said first stud having a length and diameter disposed to permit threaded engagement of said stud with one of said side mounted terminal connectors on said battery in electrical connection therewith, and to pass through the bore in one of said battery cable terminals;

a central portion on said body adjacent to and outwardly from said first stud, said central portion having a peripheral diameter greater than said first stud portion and having a first shoulder surface generally normal to the longitudinal axis of said body facing toward said inner end of said body and disposed to engage the face surface of one of said battery cable terminals in an electrically conducting relationship, and a second shoulder surface generally normal to the longtitudinal axis of said body facing toward the outer end of said body and disposed to engage the face surface of another of said battery cable terminals mounted outwardly from and adjacent thereto, in an electrically conducting relationship, said central portion having an axial length such that when said battery cable terminals are in engagement with respective said first and second shoulder surfaces, their insulating covers are spaced axially apart;

means defining wrench surfaces formed on the periphery of said central body portion and spaced axially from said first and second shoulder surfaces; and

a second generally cylindrical stud having an unthreaded

portion adjacent and axially outward of said second shoulder surface, and a threaded portion adjacent to said unthreaded portion and extending outwardly therefrom to the outer end of said body, said unthreaded portion having a diameter sufficiently less than the diameter of said threaded portion to permit passage of a nut threadedly mounted on said threaded portion and having an axial width less than the axial width of said nut, whereby when said nut is threadedly moved along said threaded portion toward the inner end of said bolt it will pass over said unthreaded portion and engage said second shoulder surface before disengaging from said threaded portion.

4,673,241

DIFFRACTION GRATINGS AND OPTICAL BRANCHING FILTER ELEMENTS

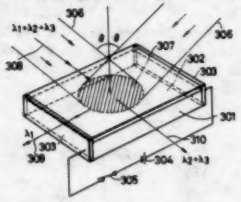
Yoshikazu Nishiwaki; Shunji Matsuoka, and Kenji Okamoto, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Division of Ser. No. 486,171, Apr. 18, 1983, Pat. No. 4,560,249. This application Oct. 10, 1985, Ser. No. 786,028

Claims priority, application Japan, Apr. 16, 1982, 57-63313; Apr. 20, 1982, 57-66585; Apr. 30, 1982, 57-72713

Int. Cl.⁴ G03H *1/02*; G02B *6/42*

U.S. Cl. 350—3.64 **6 Claims**



1. An optical branching filter element comprising a substrate a waveguide provided on the substrate, said waveguide being made of a material capable of reversibly changing its refractive index on application of light and serving to guide light in a plane, and a diffraction grating formed on the waveguide by a holographic exposure method or a light beam scanning method and erasable by suitable erasing means, respectively.

4,673,242

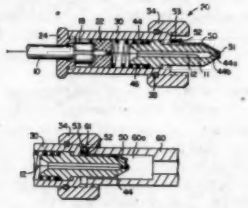
MOVABLE CLOSURE FOR OPTICAL ELEMENTS

Maurus C. Logan, Elizabeth, and Francis Sladen, Neshanic Station, both of N.J., assignors to Thomas & Betts Corporation, Raritan, N.J.

Continuation of Ser. No. 332,716, Dec. 21, 1981. This application Oct. 5, 1984, Ser. No. 657,908

Int. Cl.⁴ G02B *6/36*

U.S. Cl. 350—96.20 **2 Claims**



1. An apparatus for connecting optical elements comprising:

an elongate housing having a central axial bore extending therethrough for receipt of a terminal end of one said optical elements, said housing including an end portion having an end aperture axially aligned and in communication with said bore;

connecting means inclusive of said one end of said housing for connecting said housing to a second optical element; and

a resilient shroud member mounted on said housing, said shroud member having an engagement portion adjacent said bore, adapted to be engaged upon connection of said housing to said second optical element, said shroud being resiliently movable upon engagement of said engagement portion from a first position wherein said bore is closed, thereby preventing entry of contaminents into said bore, to a second position wherein said bore is opened, wherein said shroud member further includes:

a longitudinal portion flexibly mounted at one end at a pivot point on the external surface of said elongate housing;

a transverse portion at the other end of said longitudinal portion extending across said housing aperture, said transverse portion including a shroud aperture disposed to be in non-alignment with said housing aperture in said first position and to be aligned with said housing aperture in said second position.

4,673,243

BRANCH STRUCTURES FOR ROD-TYPE OPTICAL TRANSMISSION LINES

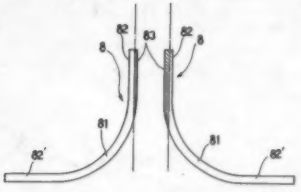
Hiroshi Yamashita, Ikeda; Kanenaga Fujii, Kawanishi; Junji Hayakawa, Takatsuki; Toru Komiyama, Kawanishi, and Sinji Tamaru, Suita, all of Japan, assignors to Director-General of Agency of Industrial Science & Technology and Diakin Kogyo Co., Ltd., both of, Japan

Filed Feb. 26, 1985, Ser. No. 705,790

Claims priority, application Japan, Apr. 10, 1984, 59-72178; Apr. 10, 1984, 59-72179

Int. Cl.⁴ G02B *6/26, 6/42*

U.S. Cl. 350—96.15 **10 Claims**

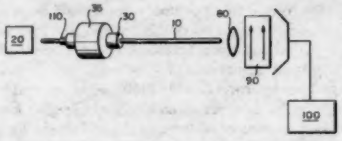


1. A branch structure for a rod-type optical transmission line having a quartz rod core, characterized in that a substantially L-shaped quartz rod branch member is connected at a longitudinal portion thereof to a peripheral side portion of the quartz rod core of the transmission line at a straight portion thereof by a transparent elastic joint member, the longitudinal portion of the branch member extends from the rod core with longitudinal axes of the rod core and of the longitudinal portion in parallel and with an axis of a horizontal portion of the branch member traverse to the axis of the rod core, the joint member having opposite side portions provided with attaching grooves having a circular arc cross section and which attaching grooves are fitable to the peripheral side portions of the quartz rod core and the quartz rod branch member, at least one of the attaching grooves having a radius of curvature in the side portions of the joint member slightly different from the radius of curvature of the respective peripheral side portion of the rod core and rod branch member to be fitted in the groove.

4,673,244
METHOD OF ALIGNING A POLARIZATION-PRESERVING OPTICAL FIBER WITH A SEMICONDUCTOR LASER FOR ATTACHMENT OF THE FIBER TO THE LASER

Ronald O. Miles, Falls Church, Va., assignor to Sachs/Freeman Associates, Inc., Landover, Md.

Filed Apr. 24, 1984, Ser. No. 603,414
Int. Cl.[4] G02B *6/36, 6/30*
U.S. Cl. 350—96.20 **24 Claims**



18. A method of aligning a receiving end of a polarization-preserving optical fiber with a means for emitting coherent light comprising the steps of:

(a) positioning the receiving end substantially adjacent of the coherent light emitting means;

(b) measuring an extinction ratio at the position of step (a);

(c) rotating the fiber a desired amount;

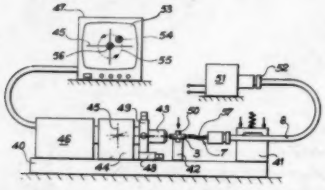
(d) remeasuring the extinction ratio at the position of step (c); and

(e) repeating steps (c) and (d) as necessary until the remeasured extinction ratio indicates that a desired alignment has been achieved.

4,673,245
OPTICAL CONNECTOR, PROCESS FOR THE PRODUCTION OF SAID CONNECTOR AND FIBRE-FIBRE AND DIODE-FIBRE CONNECTIONS OBTAINED WITH THIS CONNECTOR

Bernard Kling, Boissy Saint Yon; Roger Mongin, and Michel Leguennec, both of Paris, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Jun. 7, 1984, Ser. No. 618,197
Claims priority, application France, Jun. 8, 1983, 83 09511
Int. Cl.[4] G02B *6/36*
U.S. Cl. 350—96.20 **6 Claims**



1. A process for producing an optical connector incorporating an optical fiber having a core, a connection end and an other end, a rigid protective tube having an axis in which said connection end of said fiber is fixed, a termination having a substantially cylindrical outer surface and a bore in which said rigid tube is fixed, and means for displacing and fixing said rigid tube relative to said termination such that an axis of said connection end of said optical fiber core is substantially aligned with an axis of said termination, said connection end of said optical fiber, said rigid tube and said termination each having an endface, comprising the steps of:

(a) bonding said connction end in said rigid tube;

(b) fitting said termination onto said rigid tube and visually aligning the axis of said termination and the axis of said tube and coupling said termination and said rigid tube by adjusting said displacing and fixing means;

(c) placing said termination in a bearing vee;

(d) directing a microscope objective onto said endface of said termination and said endface of said connection end of said optical fiber;

(e) optically coupling a camera to said microscope objective;

(f) connecting a receiver to said camera for displaying the image observed by said microscope objective;

(g) injecting light into said other end of said optical fiber core;

(h) rotating said termination in said bearing vee such that the image of said injected light exiting said connection end of said optical fiber core describes a circle having a radius on said receiver;

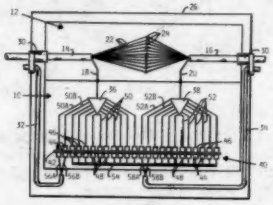
(i) manipulating said displacing and fixing means and rotating said termination repeatedly until said optical fiber attains a centered position whereat the radius of said circle is substantially equal to zero; and

(j) bonding said rigid tube to said termination when said optical fiber is at said centered position.

4,673,246
PATCH UNIT FOR FIBER OPTIC DISTRIBUTION NETWORK

John J. Schembri, Daly City, Calif., assignor to Pacific Bell, San Francisco, Calif.

Filed Aug. 24, 1984, Ser. No. 644,318
Int. Cl.[4] G02B *6/40*; G02F *1/00*
U.S. Cl. 350—96.22 **1 Claim**



1. A patch unit for use in a fiber optic distribution system or the like including a cable formed with a plurality of optical fibers, said patch unit providing means for selectively accessing one or more of the optical fibers and for maintaining continuity in additional optical fibers, said patch unit comprising:

a housing having an interior compartment;

cable receiving means mounted on said housing for receiving and supporting opposite ends of said cable within said housing; and

a plurality of optical fiber connectors each including first and second opposed ports adapted for respectively receiving optical fibers and establishing communication access therebetween, said first ports of said optical fiber connetors being positioned within said housing in an array for receiving the ends of the plurality of optical fibers in the cable, said second ports of said connectors being disposed outside said housing in an accessible array for facilitating eelective connection thereto of user fibers for establishing communication access with selected fibers from the cable and for facilitating connection thereto of jumper fiber for establishing continuity in remaining fibers in the cable; and

environmental enclosure means for enclosing said housing and for protecting said optical fibers from adverse enironmental conditions, said environmental enclosure comprising:

a base including means for mounting said housing thereon and orifice means for providing cable access to the interior of said housing means, said orifice means including grom-

met means for preventing foreign matter from entering the interior of said housing through said orifice means; and

cover means for providing removable access to said housing, said cover means being coupled to said base by screw means, said cover means in conjunction with said base means forming a chamber enclosing said housing,

wherein said housing comprises an elongated element, and wherein said plurality of optical fiber connectors is mounted upon said elongated element, said connectors being of tubular configuration for mounting on said elongated element with their first and second opposed ports in respective alignment.

4,673,247

OPTICAL CABLE FOR OVERHEAD HIGH-TENSION LINES

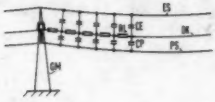
Ulrich Oestreich, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 3, 1985, Ser. No. 719,529

Claims priority, application Fed. Rep. of Germany, Jun. 29, 1984, 3424047; Feb. 6, 1985, 3504041

Int. Cl.[4] G02B *6/44;* H01B *11/22*

U.S. Cl. 350—96.23 **14 Claims**



1. An optical, aerial, overhead high-tension line cable system, comprising:

a conductive high tension power line;

a non-conductive optical cable having no electrically conductive parts and running alongside of and spaced from the power line; and

said optical cable having

at least one light waveguide,

an outer cladding surrounding the light waveguide,

means between the light waveguide and outer cladding for support and positioning of the light waveguide within the outer cladding,

said outer cladding comprising a plastic, self-quenching, self-protecting material means for providing resistance to partial discharge and tracking current and which remains relatively highly insulating and creep resistant when heated, burned, or affected by electrical influences resulting from the high tension on the power line, and

said outer cladding including a metal hydroxide between 30 and 60 weight percent.

4,673,248

REFLECTING MIRROR FOR AN AUTOMOBILE

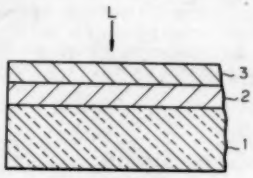
Takasi Taguchi, Anjo; Yoshiki Ueno, and Tadashi Hattori, both of Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Continuation of Ser. No. 598,432, Apr. 9, 1984, abandoned. This application Aug. 25, 1986, Ser. No. 902,028

Claims priority, application Japan, Apr. 11, 1983, 58-63415; Jul. 7, 1983, 58-123844

Int. Cl.[4] G02B *5/08, 5/28*

U.S. Cl. 350—166 **7 Claims**



1. A reflecting colored mirror for an automobile having anti-glare effects comprising:

an opaque thin metal layer having a reflecting factor ranging from 50% to 70%, said metal layer defining a first light reflecting surface; and

a thin layer made of a transparent dielectric material, said dielectric layer being formed on said surface of said thin metal layer, said dielectric layer forming a second light-reflecting surface on a surface of said dielectric layer opposite said first light-reflecting surface of said thin metal layer, the thickness of said dielectric layer being sufficiently thin to allow the surface of said dielectric layer to have negligible roughness resulting in good interference for selected frequencies of visible light, said thickness, taken into consideration with said metal layer reflecting factor and said dielectric layer refractive index, causing a required interference effect by light reflected from said first and second light-reflecting surface so that the reflecting factor of said mirror is from 38% to 65%.

4,673,249

DRIVE FOR A PRISMATIC COMPENSATOR

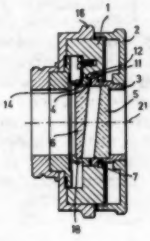
Horst Schneider, Königsbronn; Wilhelm Schmidt, Rainau-Buch, and Erwin Daniels, Aalen, all of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim, Fed. Rep. of Germany

Filed Jun. 7, 1985, Ser. No. 742,571

Claims priority, application Fed. Rep. of Germany, Jul. 14, 1984, 3425971

Int. Cl.[4] G02B *7/18*

U.S. Cl. 350—287 **7 Claims**



1. A drive for the two prismatic wedges of a prismatic compensator, the drive comprising:

two fittings for accommodating corresponding ones of the prismatic wedges;

mounting means for mounting said fittings so as to be rotatable about a common axis;

a pull wire mounted on the periphery of one of said fittings so as to surround the same in a first direction of rotation about said axis and on the periphery of the other one of said fittings so as to surround the same in a second direction of rotation about said axis which is opposite to said first direction of rotation, said wire being mounted under pull tension so as to cause the other one of said fittings to rotate through a predetermined angle about said axis in said second direction when said one fitting is rotated about said axis through said angle in said first direction; and,

actuating means operatively connected to said one fitting for rotating the same about said axis.

4,673,250

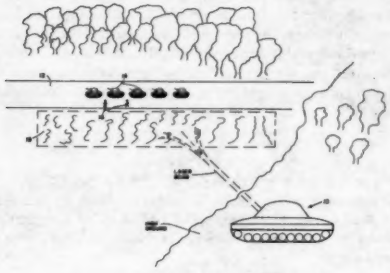
CO_2 LASER WEAPON COUNTERMEASURE

Thomas G. Roberts, Huntsville, and Thomas E. Honeycutt, Somerville, both of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 9, 1985, Ser. No. 764,021

Int. Cl.[4] G01J *1/00*; G02B *5/22, 26/02*

U.S. Cl. 350—320 **5 Claims**



1. A laser weapon countermeasure method comprising dispensing a chemical countermeasure into air of the atmosphere between that which is desired to be protected and a high power laser weapon so that said chemical countermeasure is provided along a predetermined length and of a predetermined height so as to be in the line of sight between the high power laser weapon and that which is desired to be protected, said chemical countermeasure in said atmosphere being sufficient to cause high powered laser energy radiation of 10.6 μm from said laser weapon to bloom and be dissipated and allow that desired to be protected to pass by and out of range of said high powered laser weapon, said chemical countermeasure consisting of a chemical selected from the group consistings of 1,1-difluoroethylene, dichlorodifluoromethane, perfluoro-2-butene, octafluorocyclobutane, chloropentafluoroethane, 1,2-dichlorotetrafluoroethane, 1,1-difluoro-1-chlorethane, 1,1-difluoroethane, 3-methyl-1-butene, ethylene, propylene, and dimethyl ether, and said chemical countermeasure being dispensed in an amount of about 2 to about 10 pounds over a length of about 1 km.

4,673,251

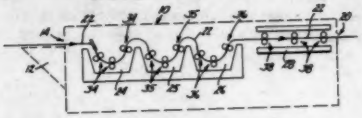
APPARATUS AND METHOD FOR TRANSPORTING PHOTOSENSITIVE SHEETS IN A PHOTOPROCESSOR

Benjamin H. Sannel, St. Louis Park, Minn., assignor to Pako Corporation, Minneapolis, Minn.

Filed Dec. 18, 1985, Ser. No. 810,408

Int. Cl.[4] G03D *3/08*

U.S. Cl. 354—322 **9 Claims**



1. In a processor of sheets of photosensitive material having a plurality of processing stations for the sheets, a plurality of drive rollers which define a sheet processing path through the processing stations from a first end of processor to a second end thereof, and drive means for rotating the rollers to transport the sheets along the path, the improvement which comprises:

means for rotating a first set of the drive rollers at selected processing stations adjacent to the second end of the processor at a faster rotation rate than the driven rotation rate of a second set of the drive rollers at the other processing stations; and

bearing means associated with each roller of the second set of rollers for permitting said roller to overrun its driven rate of rotation.

4,673,252

LIQUID CRYSTAL COLOR DISPLAY APPARATUS HAVING FIXED AND VARIABLE COLOR REGIONS

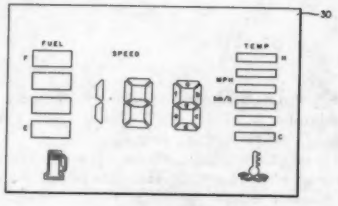
Masaru Kugo, Ibaraki; Osamu Igarashi, Katsuta; Kozo Katogi, Katsuta; Hiroshi Ito, Katsuta, and Mamoru Nakamura, Katsuta, all of Japan, assignors to Hitachi, Ltd. and Hitachi Automotive Engineering Co., Ltd., both of, Japan

Filed Apr. 11, 1986, Ser. No. 850,684

Claims priority, application Japan, Apr. 17, 1985, 60-76470; Apr. 17, 1985, 60-80206

Int. Cl.[4] G02F *1/13*

U.S. Cl. 350 V—339 F **10 Claims**



1. A liquid crystal display apparatus comprising a liquid crystal display panel having segment electrodes and common electrodes interposing liquid crystal material therebetween and a liquid crystal drive circuit, said panel including a variable-color display section which is provided with color filters in a plurality of colors arranged on said segment electrodes or on said common electrode so as to produce arbitrary color in said variable-color display section through selective activation of said segment electrodes, and a fixed-color display section which is provided with a color filter placed outside of said liquid crystal display panel, wherein said liquid crystal drive circuit is operative to control said liquid crystal display panel so as to separately control said variable-color display section and said fixed-color display section.

4,673,253

METHOD OF MAKING A LIQUID CRYSTAL DISPLAY WITH COLOR FILTERS

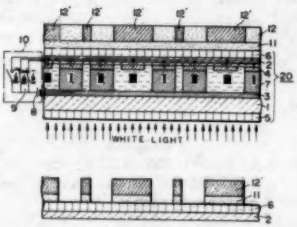
Hiroshi Tanabe, Saitama; Etsuo Yamamoto, Tokyo; Seigo Togashi; Kanetaka Sekiguchi, both of Saitama; Katsumi Aota, Tokyo, and Kazuaki Sorimachi, Saitama, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 652,327, Sep. 19, 1984, abandoned. This application Apr. 4, 1986, Ser. No. 848,894

Claims priority, application Japan, Oct. 7, 1983, 58-186982

Int. Cl.[4] G02F 1/13; C09K 19/00

U.S. Cl. 350—339 F 3 Claims



1. A process for making a liquid crystal display device having a color filter by a photolithographic method, the process comprising the steps of:

providing a liquid crystal shutter device having:

a pair of opposed glass plates;

opposed electrode groups on the respective inner surfaces of the glass plates;

at least one polarizer;

a liquid crystal layer between the opposed electrode groups; and

a voltage applying means for selectively applying

a voltage applying means for selectively applying a voltage across the electrode groups;

forming a layer being colored on one surface of the liquid crystal shutter device;

forming a photoresist layer thereon;

while illuminating the liquid crystal shutter device from the other surface thereof by white light, applying the voltage across the selected opposed electrode groups through the voltage applying means to form a latent image on the photoresist layer by a photochemical action, the latent image being aligned with the electrode groups;

developing the latent image to form a photomask;

after a while, while using the photomask as a guide, coloring the layer being colored to form a color filter layer; and

forming a diffusion preventing layer on the color filter layer for protecting the color filter layer.

4,673,254

BACK-REFLECTION TYPE LIGHT DIFFUSING APPARATUS

Kuniaki Kato, and Mutsumi Takahashi, both of Tokyo, Japan, assignors to Tokyo Keiki Co., Ltd., Tokyo, Japan

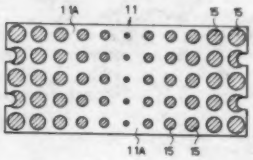
Filed Jul. 18, 1986, Ser. No. 886,892

Claims priority, application Japan, Jul. 30, 1985, 60-168257

Int. Cl.[4] G02F 1/13; F21V 7/00, 3/00, 5/00

U.S. Cl. 350—345 12 Claims

1. A back-reflection type light diffusing apparatus including a light guiding plate having one surface which forms a first surface through which light is radiated and an opposite surface which forms a second surface against which light is reflected such that light illuminated from a predetermined light source located near the lateral end of said light guiding plate is introduced into said light guiding plate and is radiated from said light radiating surface,



wherein the area of said light reflecting surface is so distributed that it decreases the closer it becomes to said light source.

4,673,255

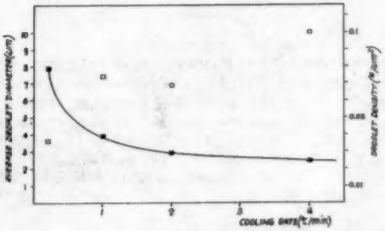
METHOD OF CONTROLLING MICRODROPLET GROWTH IN POLYMERIC DISPERSED LIQUID CRYSTAL

John West, 5050 Fish Creek Rd., Stow, Ohio 44224; Attilio Golemme, 350 Silver Oaks Dr.-#2, and Joseph W. Doane, 1618 S. Lincoln St., both of Kent, Ohio 44240

Continuation-in-part of Ser. No. 866,216, May 22, 1986, which is a continuation-in-part of Ser. No. 776,831, Sep. 17, 1985, which is a continuation-in-part of Ser. No. 590,996, Mar. 19, 1984, abandoned. This application Jun. 27, 1986, Ser. No. 879,269

Int. Cl.[4] G02F 1/13

U.S. Cl. 350—347 V 17 Claims



1. In a method of making liquid crystal microdroplets dispersed in a polymeric matrix by phase separating a homogeneous solution of liquid crystal and polymer, the improvement comprising the step of controlling microdroplet growth so that the microdroplets have a selected average diameter when phase separation is complete.

4,673,256

PROCESS FOR CONTROLLING A MATRIX ACCESS DISPLAY DEVICE

Robert Hehlen, Morangis; Michel Hareng, La Norville; Serge Le Berre, Dampierre, and Bruno Mourey, Boulogne Billancourt, all of France, assignors to Thomson-CSF, Paris, France

Filed Nov. 26, 1984, Ser. No. 674,868

Claims priority, application France, Nov. 29, 1983, 83 19022

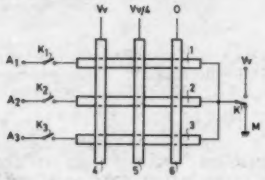
Int. Cl.[4] G02F 1/133

U.S. Cl. 350—350 S 7 Claims

1. In a process for controlling a display device comprising an active material layer reacting to a combined thermal and electric effect, the device comprising a first and second electrode networks, these networks being crossed so as to provide matrix addressing of the device, the electrodes of the first layer allowing zones of said layer to be heated successively, electric control fields being applied to said zones during cooling thereof for a predetermined time by electrodes surrounding said layer, said electric fields being generated from DC control voltages

called video voltages, wherein, in order to remove any DC component from the electric fields applied to said layer, the electrodes applying said fields are brought to potentials such that said electric control fields are alternately directed in one direction then in the opposite direction.

2. The control process as claimed in claim 1, wherein said control video voltages are distributed by the surrounding electrodes formed on the one hand by the first electrode network and on the other by the second electrode network and, with the video voltage values varying from 0 to a maximum



value Vv, alternation of the directions of said electric control fields is achieved by:

during the time of one half wave, bringing the potential of the heating electrode of a zone to be addressed to O whereas the electrodes of the second network are brought to potentials corresponding to said video potentials,

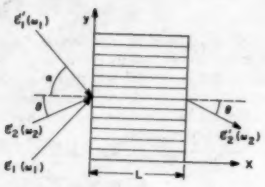
during the time of the other half wave, bringing the potential of said heating electrode to the maximum value Vv whereas the electrodes of the second network are brought to potentials complementary with respect to Vv to those of the preceding half wave.

4,673,257

METHOD OF AND APPARATUS FOR CORRECTION OF LASER BEAM PHASE FRONT ABERRATIONS

Mordechai Rokni, Mevasseret Zion, Israel, and Allen M. Flusberg, Newton, Mass., assignors to Avco Corporation, Greenwich, Conn.

Filed Jun. 19, 1985, Ser. No. 746,655
Int. Cl.[4] G02F *1/01*; H01S *3/10*
U.S. Cl. 350—354 **14 Claims**



1. In the method of laser beam wave front phase compensation the steps comprising:

(a) providing a gaseous medium comprising a mixture of a first gas and a buffer gas, said first gas having a first resonance transition and a second higher transition where both said transitions are allowed electric dipole transitions, said buffer gas substantially collisionally broadening said first and second transitions of said first gas;

(b) maintaining said gaseous medium at a pressure whereby spectral broadening of said first and second transitions is collision-dominated;

(c) providing a first controlling laser beam having a first wavelength and having substantially no phase front aberrations, said first wavelength being at least near resonance with said first transition;

(d) providing a second controlling laser beam at said first wavelength and having substantially no phase front aberrations;

(e) providing a controlled laser beam having a second wavelength at least near resonance with said second transitions;

(f) directing said controlled laser beam along a path resulting in first aberrations of its phase front;

(g) directing said first controlling laser beam along said path resulting in second aberrations of its phase front at least substantially the same as said first phase front aberrations;

(h) combining said first controlling laser beam with said second aberrations with said second controlling laser beam whereby they interfere one with another and causing said combined controlling laser beams to be incident on said gaseous medium and induce a predetermined change in the refractive index of said gaseous medium at a wavelength at least near said second wavelength; and

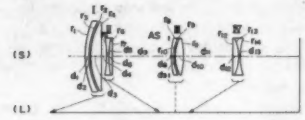
(i) causing said controlled laser beam to be incident on said gaseous medium collinear with said combined controlling laser beams.

4,673,258

ULTRA COMPACT ZOOM LENS SYSTEM

Hisayuki Masumoto, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sep. 5, 1984, Ser. No. 647,711
Claims priority, application Japan, Sep. 6, 1983, 58-164768; Dec. 28, 1983, 58-251085; Aug. 28, 1984, 59-178694
Int. Cl.[4] G02B *7/04, 15/15*
U.S. Cl. 350—427 **13 Claims**



1. An ultra compact zoom lens system, comprising from object side to image side:

a first lens unit of a positive refractive power;

a second lens unit of a negative refractive power with a first variable air space formed between the first and second lens units;

a third lens unit of a positive refractive power; and

a fourth lens unit of a negative refractive power with a second variable air space formed between the third and fourth lens units;

wherein the first lens unit is shiftable from the image side to the object side while increasing the first variable air space in the zooming operation from the shortest focal length to the longest focal length; and

wherein the fourth lens unit is shiftable from the image side to the object side while decreasing the second variable air space in the zooming operation from the shortest focal length to the longest focal length.

4,673,259

WIDE ANGLE LENS SYSTEM HAVING SHORT OVERALL LENGTH

Atsushi Kawamura, Yokosuka, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 12, 1986, Ser. No. 838,836
Claims priority, application Japan, Mar. 15, 1985, 60-50614
Int. Cl.[4] G02B *9/60*
U.S. Cl. 350—465 **4 Claims**

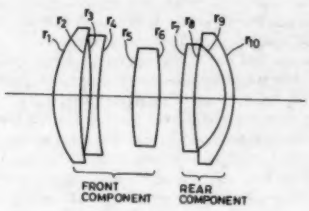
1. A wide angle lens system having a short overall length comprising five lenses consisting of a front-group in the form of a triplet and a rear-group of two negative lenses, said two negative lenses in the rear-group being meniscus lenses with surfaces of stronger curvature facing each other, the wide angle lens system satistying the following conditions:

$0<f_{1,2}$

$0.7<|f_R|/f<1$

where

f: focal length of the entire system



$f_{1,2}$: combined focal length of a first and a second lenses from an object side

f_R: focal length of the rear-group

4,673,260

STEREOSCOPIC OPTICAL DEVICE

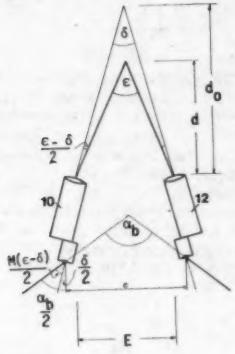
Itzchak Z. Steinberg, Rehovot, Israel, assignor to Yeda Research & Development Co., Ltd., Rehovot, Israel

Filed Oct. 4, 1984, Ser. No. 657,878

Claims priority, application Israel, Oct. 16, 1983, 69975

Int. Cl.[4] G02B *21/22, 7/06*

U.S. Cl. 350—516 **4 Claims**



1. Stereo microscope apparatus of the common main objective type comprising:

first and second parallel telescopes defining first and second optical axes and having identical magnification M;

a common main objective lens having a focal length F;

a stage defining an object location wherein the stage is located in a plane located a distance from the focal plane of the main objective lens which is equal to the distance E separating the optical axes defined by the first and second parallel telescopes divided by the product of M and the angle gamma which is the angle between the two light rays originating from the observed object and passing through the telescopes; and

reticles associated with the first and second optical axes to provide a visible indication of proper angular alignment of the optical axes of the telescopes or object location which produces correct depth perception, wherein the reticles are in each case located a distance from the optical axis in the focal plane of the ocular given by the expression

$0.5\times f\times$gamma

where f is the focal length of the ocular lens.

4,673,261

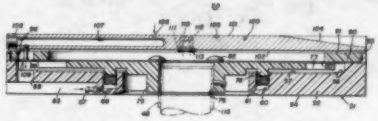
MOTION CONTROL APPARATUS FOR PRECISE REPEATABLE POSITIONING

Gary D. Hunt, Irvine, and Helmut Gilles, Dana Point, both of Calif., assignors to Alessi Industries, Inc., Irvine, Calif.

Filed May 16, 1985, Ser. No. 734,899

Int. Cl.[4] G02B *21/26;* B23Q *3/08*

U.S. Cl. 350—531 **23 Claims**



1. Motion control apparatus for accommodating motion parallel to a predetermined axis while preventing incidental motion, said apparatus comprising: fixed means having a flat upper surface, movable means, motive means coupled to said movable means for effecting movement thereof, and a single control member independent of said motive means disposed perpendicular to said predetermined axis, said control member overlying said flat surface of said fixed means for supported engagement therewith and being fixedly secured thereto centrally thereof at a first attachment location, said control member having a peripheral portion extending laterally a slight distance beyond the periphery of said flat surface of said fixed means and being fixedly secured to said movable means at a second attachment location, said control member being continuous and uninterrupted between said first and second attachment locations for supporting said movable means on said fixed means, said control member being flexible in directions parallel to said predetermined axis and being rigid in all other directions to accommodate movement of said movable means with respect to said fixed means only parallel to said predetermined axis.

4,673,262

COMPACT FINDER

Sadahiko Tsuji, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 4, 1984, Ser. No. 677,916

Claims priority, application Japan, Dec. 5, 1983, 58-187892[U]

Int. Cl.[4] G02B *23/04, 25/00, 27/16, 17/08*

U.S. Cl. 350—538 **7 Claims**

1. An eyepiece lens system for observing an image of an object comprising:

an eyepiece lens including a plurality of lens units and having a frontmost surface and a rearmost surface;

reflecting means having reflection surfaces to reflect light which passes a preceding one of said lens units to a next one of said lens unit; and

a distance from the image of the object to the frontmost

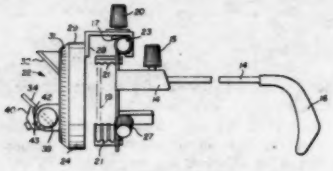
surface of the eyepiece lens along the optical axis being greater than a length of the frontmost surface to the rearmost surface of the eyepiece lens.

4,673,263

OPTICAL IMAGE DEFLECTOR ASSEMBLY AND METHOD FOR LOCATING VISUALLY SENSITIVE PERIPHERAL AREAS OF AN EYE, AND DETERMINING CORRECTIVE PRISMATIC EYE GLASSES THEREFORE

Michael Onufryk, 9 Wickford Way, Fairport, N.Y. 14450

Filed Oct. 21, 1982, Ser. No. 435,767
Int. Cl.[4] G02C *1/00, 7/14*
U.S. Cl. 351—158 **11 Claims**



1. An eye examining apparatus for scanning an eye and locating visually sensitive peripheral areas of the eye comprising:

a frame;

a rotatable optical assembly mounted on said frame with the mechanical center of said optical assembly aligned with the optical center of an eye to be scanned;

said optical assembly having a fixed light reflecting optical element and a pivotal light reflecting optical element, said fixed and pivotal optical elements cooperating together for directing light onto a peripheral area of an eye and scanning an arcuate portion of said area upon pivotal movement of said pivotal optical element; and

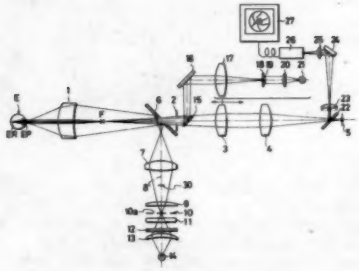
means for selectively incrementally rotating said optical assembly a revolution and pivoting said optical element at each incremental movement for scanning an annular peripheral area of an eye and locating any visually sensitive areas wherein.

4,673,264

OPHTHALMIC INSTRUMENT HAVING FOCUS DETECTING MARK PROJECTING MEANS

Susumu Takahashi, Tokyo, Japan, assignor to Tokyo Kogaku Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 22, 1984, Ser. No. 582,330
Claims priority, application Japan, Feb. 25, 1983, 58-30461
Int. Cl.[4] A61B *3/10*
U.S. Cl. 351—211 **6 Claims**



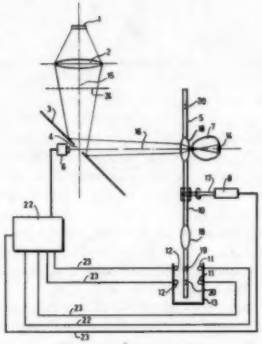
1. An ophthalmic instrument including an observing optical system having objective lens means adatped to be placed opposite to a patient's eye, a mark projecting optical system for optically projecting a mark through a pupil to a retina of the patient's eye to produce a mark image at the retina, said mark image including a plurality of mark segments so that a corresponding number or mark segment images are to be produced at the retina, said mark projecting optical system including focusing means for adjusting focus conditions of the mark image, signal detecting electrical means for detecting the mark image segments and producing an electric signal corresponding to the mark image segments, threshold level setting means for producing a succession of threshold level signals, decreasing in level from an initial level higher than the level of the mark image signals mark image discriminating means for comparing the electric signal from the signal detecting electrical means with each of said threshold level signals to produce a mark image signal when the signal from the signal detecting electrical means is greater than the threshold level signal, means for counting said mark image signals from the mark image discriminating means, means for comparing said count of the mark image signals from the mark image discriminating means with the number of mark image segments, means responsive to said comparison of the mark image signals for selecting the next successive one of the succession of threshold signal levels in the threshold level setting means when said count of the mark image signals from the mark image discriminating means is less than the number of mark image segments, means for determining the distance between the mark image signals when said count of the mark image signals from the mark image discriminating means is equal to the number of mark image segments, and means responsive to said distance determining means for adjusting said focusing means to adjust the focus condition of the mark image.

4,673,265

PROCEDURE AND DEVICE FOR AUTOMATIC REFRACTOMETRIC MEASUREMENT OF THE DEGREE OF AMETROPIA OF A HUMAN EYE

Jean C. Hache, Lille, and Mireille Servant, Villeneuve D'Ascq, both of France, assignors to Essilor International (Compagnie Generale d'Optique), Creteil, France

Continuation of Ser. No. 769,758, Aug. 26, 1985, abandoned, which is a continuation of Ser. No. 442,588, Nov. 18, 1982, abandoned. This application Sep. 5, 1986, Ser. No. 904,777
Claims priority, application France, Nov. 23, 1981, 81 21868
Int. Cl.[4] A61B *3/10*
U.S. Cl. 351—217 **3 Claims**



1. Apparatus for refractometrically measuring the degree of ametropia of a human eye placed at a location predetermined with respect to said apparatus, comprising:

(a) a light source;

(b) optical means for shaping light emitted by said light

source into a focused light beam propagated along a light path;

(c) a mirror interposed in said light path between said source and said eye for directing said beam to said eye in a given direction defined by an optical test axis coinciding with the optical axis of said eye, so as to produce on the retina of said eye an image of said light source, said mirror including an aperture substantially centered in said light path such that a light projection on a plane at right angles to the optical axis of the eye is circular;

(d) a circular disk mounted for rotation about its center;

(e) a plurality of corrective testing lenses mounted on said circular disk with respective centers of said lenses located on a common circle having its center coinciding with the center of said disk, each lens being positionable adjacent said eye in said reflected light path from said mirror, and said testing lenses having different respective optical power values;

(f) motor means for rotating said disk stepwise about an axis of rotation which contains the center of said disk and which is parallel to said optical test axis;

(g) indicia means for identifying each of said testing lenses and for indicating when any one of the thus identified testing lenses is interposed across said reflected light path, said indicia means including optically detectable holes in said disk and photo detector means for optically detecting said holes in said disk to indicate when a testing lens is interposed across said reflected light path;

(h) a light detector means disposed and optically centered on the optical test axis behind the mirror for receiving light reflected through the interposed test lens and through the aperture in the mirror; and

(i) signal generating and processing means associated with said respective corrective testing lens and said light detector means for identifying that one of said corrective testing lenses which, when interposed across said light beam, transmits to said light detector means a minimum amount of light reflected by said retina in response to said image.

4,673,266

DISPLAY OF SUBTITLES DURING THE SCREENING OF A MOTION PICTURE

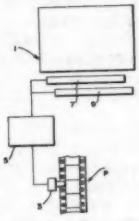
Fabrizio Fiumi, Via S. Agostino, 5, 50125 Firenze, Italy

Filed Jun. 15, 1984, Ser. No. 620,985

Claims priority, application Italy, Jun. 17, 1983, 9458 A/83

Int. Cl.⁴ G03B *21/32*

U.S. Cl. 352—90 **13 Claims**



1. Apparatus for display of subtitles during projection of a cinematographic film comprising

a film strip having a plurality of frames adapted to cooperate with a projector for forming an image of said frames, said film strip having coded signals thereon,

detector means for sensing the presence of said coded signals and for producing an output representative of a sensed coded signal,

processor means containing a plurality of preselected subtitles for selecting a specific subtitle in response to an input signal from said detector means, and

display means for displaying said selected subtitle in response to an input from said processor means.

4,673,267

VIDEO CAMERA

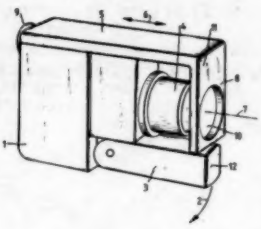
Tomas Erxleben, Hemmingen, Fed. Rep. of Germany, assignor to Deutsche AG für Unterhaltungselectronic OHG, Villingen-Schwenningen, Fed. Rep. of Germany

Filed Jun. 3, 1986, Ser. No. 870,116

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1985, 3520459

Int. Cl.⁴ G03B *13/02, 17/02, 21/14*

U.S. Cl. 352—242 **10 Claims**



1. In a video camera comprising a housing having a longitudinal dimension, a lens mounted in the housing, and a viewfinder carried by the housing for observing the scene to be recorded, the improvement comprising: a part mounted on said housing for sliding movement in the direction of the longitudinal dimension of said housing between a forward end position in which said part provides protection for said lens and a rear end position in which said part uncovers said lens.

4,673,268

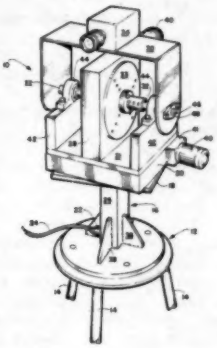
PAN AND TILT MOUNT

Ernest E. Wheeler, 5938 Eton Ct., San Diego, Calif. 92122; David C. Wheeler, 7860 Dancy Rd., San Diego, Calif. 92126, and William M. Wheeler, 5938 Eton Ct., San Diego, Calif. 92122

Filed May 12, 1986, Ser. No. 861,925

Int. Cl.⁴ G03B *17/00*

U.S. Cl. 352—243 **14 Claims**



1. A pan and tilt mount comprising:

a fixed in position support member;

a horizontal oriented pan assembly rotatably connected to said support member;

a stepping motor for driving said pan assembly through 360°

of rotation through a range of 0.0001 to 0.05 degree steps in either direction of rotation;

a vertical oriented tilt assembly carried by said horizontal oriented pan assembly and rotatable therewith;

a stepping motor for driving said tilt assembly through at least 270° of rotation in either direction;

a remote stepping motor controller means for controlling the rotation of said stepping motors;

a rotatable connector means intermediate said remote stepping motor controller means and said stepping motors, and

a platform means connected to said tilt mount and rotatable therewith.

4,673,269

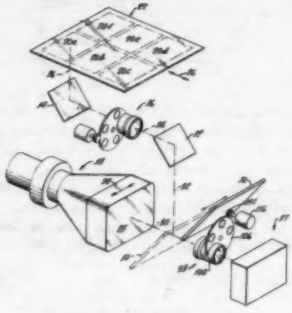
COMPACT MULTIPLE IMAGE CAMERA WITH COLOR FILTER WHEEL

Otto M. Schiff, 18026 Mann, Irvine, Calif. 92715, and Vitolds Rikis, 25432 Marina Cir., Mission Viejo, Calif. 92691

Filed Mar. 25, 1985, Ser. No. 715,243

Int. Cl.[4] G03B *29/00, 1/00;* **G01D** *9/42;* **H04N** *5/84*

U.S. Cl. 354—76 **14 Claims**



1. A compact multiple image camera comprising

a housing,

a video monitor in said housing having a screen forming images to be photographed,

optical means mounted to said housing for transmitting light from the screen along a folded optical path having an output axis, said optical means comprising,

a lens mounted in said optical path, said lens having a plurality of lens elements,

a filter assembly having a rotatably mounted disc extending between two of said lens elements, said disc having a plurality of circumferentially spaced filter elements adapted to be selectively positioned between said two lens elements as the disc rotates,

motor means for rotating the disc,

means for supporting film in a plane perpendicular to said output axis and adjacent said monitor,

means for effecting relative displacement of said film and said monitor perpendicular to said output axis, said optical means including a first mirror positioned in front of said screen for reflecting light from the screen in a direction substantially parallel to the screen, an auxiliary camera module, means for mounting said auxiliary camera module to said housing in position to photograph said video monitor screen, said mirror being interposed between said auxiliary camera module and said screen, and means for mounting said mirror to said housing for motion between a first position in which it reflects light from the monitor along said optical path in a direction generally parallel to said screen and in which the mirror blocks passage of light from the screen to said auxiliary camera module, and a second position in which the mirror does not interfere with passage of light from the screen to the auxiliary camera module.

4,673,270

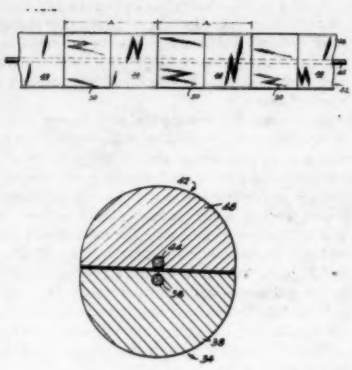
CHANNEL ADD/DROP FILTER-COUPLER

Eugene I. Gordon, Convent Station, N.J., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 28, 1985, Ser. No. 750,808

Int. Cl.[4] G02B *6/26*

U.S. Cl. 350—96.15 **35 Claims**



1. An optical filter-coupler for coupling optical signals at a design frequency, comprising:

a first single-mode optical fiber with a first refractive index profile and a first propagation constant that is a function of frequency, the first optical fiber having a core and cladding, the cladding having a substantially planar surface;

a second single-mode optical fiber with a second refractive index profile and a second propagation constant that is a function of frequency, the second optical fiber having a core and cladding, the cladding having a substantially planar surface;

wherein the first refractive index profile is different than the second refractive index profile;

wherein a plurality of channels is formed in the planar surface of the first optical fiber, the channels being spaced with a predetermined channel period, the channel period being substantially inversely proportional to the difference between the first propagation constant and the second propagation constant at the design frequency; and

wherein the first optical fiber and the second optical fiber are joined at the planar surfaces.

4,673,271

MECHANISM IN SINGLE-LENS REFLEX CAMERAS

Alf I. Alfredsson, Sävedalen, Sweden, assignor to Victor Hasselblad AB, Goteborg, Sweden

Filed Oct. 4, 1985, Ser. No. 784,814

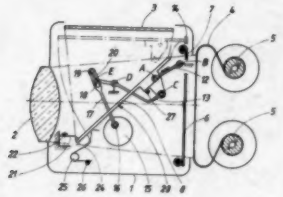
Claims priority, application Sweden, Oct. 8, 1984, 8405018

Int. Cl.[4] G03B *19/12*

U.S. Cl. 354—152 **2 Claims**

1. Mechanism for controlling the movement of a viewing mirror in a camera body of a single-lens reflex camera between a viewing position and an exposure position, the mirror having a main plane, a first border and an opposite second border, the first and second borders being connected by side borders, the mechanism including a shaft connected to the camera body and carrying the mirror adjacent to its second border parallel to the same for swinging movement of the mirror between its positions about a first axis provided by said shaft, carrying arms having one end thereof carrying the mirror by means of

said shaft and with the other end thereof pivotably connected to the camera body at a second axis at a distance from the first axis and substantially parallel to the same, the main direction of the arms between the first and second axes being transverse to the swinging path of the first border of the mirror and extending outwards of the first axis toward the second border and being adapted, when actuated, to swing with their one ends connected to the mirror in the same direction as the movement of the mirror, moving means including an actuating arm carried by the camera body about a third axis and connected to the mirror at a fourth axis, the third and second axes being substantially parallel to the first and second axis, maneuvering



means for swinging the actuating arm around the third axis for swinging of the mirror between its two positions, and stopping means for stopping the swinging movement of the first border of the mirror when it is in its viewing position but allowing transversal movement in the direction of the main plane of the mirror in a direction towards its second border by swinging of the carrying arms to move out of engagement with the stopping means which thereafter allows swinging of the mirror and the actuating arm extending with a main portion thereof from said third axis to said fourth axis in a direction from the first border towards the second border of the mirror transverse to the swinging path of the first border of the mirror.

4,673,272

FILM TRANSPORT APPARATUS FOR CAMERA

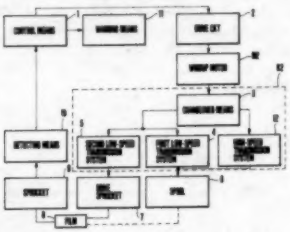
Masayuki Suzuki, Kanagawa; Tsunemasa Ohara; Yoichi Tosaka, both of Tokyo; Ryuichi Kobayashi, Kanagawa; Yoshihito Harada, Kanagawa, and Masaharu Kawamura, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha

Filed May 19, 1986, Ser. No. 865,063

Claims priority, application Japan, May 24, 1985, 60-111667; Jan. 25, 1986, 61-13014

Int. Cl.[4] G03B *1/18, 1/58*

U.S. Cl. 354—173.11 **20 Claims**



1. A film transport apparatus for a camera comprising:

(a) a spool for taking up film by rotation;

(b) a sprocket for sending the film to said spool by rotation;

(c) first windup drive means for driving both of said spool and said sprocket;

(d) second windup drive means for driving said spool;

(e) control means for changing over the winding-up drive operation from said first windup drive means to said second windup drive means midway through a film autoloading; and

(f) detecting means for detecting that the film has not been moved to a prescribed length after the changeover of said windup drive operation by said control means.

4,673,273

PROCESSING APPARATUS FOR PHOTOSENSITIVE MATERIAL

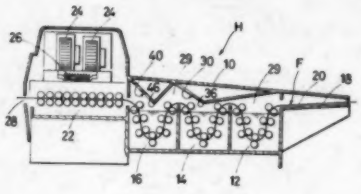
Yasuhito Yoshimi, Mukoh, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed Feb. 12, 1986, Ser. No. 828,732

Claims priority, application Japan, Jul. 12, 1985, 60-107450[U]

Int. Cl.[4] G03D *3/13*

U.S. Cl. 354—322 **1 Claim**



1. In a processing apparatus for photosensitive material comprising a plurality of processing baths including a developing bath, a fixing bath and a washing bath arranged in order, through which the photosensitive material is continuously and sequentially passed for processing said photosensitive material, an improvement which comprises:

at least one condensate droplet guide member arranged above at least one of the processing baths, in face-to-face relationship with at least one of the said processing baths, said droplet guide member having a surface region facing towards at least one of said processing baths and generally corrugated so as to have a series of alternating ridges and grooves inclined relative to a horizontal plane to provide numerous flow paths to guide and prevent said droplets from dropping onto said photosensitive material therebelow, the lowest end of said droplet guide member being located above any one of said processing baths other than the developing bath.

4,673,274

AUTOMATIC FOCUSING APPARATUS FOR CAMERA

Yoshitomi Nagaoka, Neyagawa; Yoshiteru Matsuda, Sakurai; Yoshiaki Hirao, Habikino; Ryuichiro Kuga, Katano, and Hiroyuki Asakura, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Sep. 13, 1985, Ser. No. 776,031

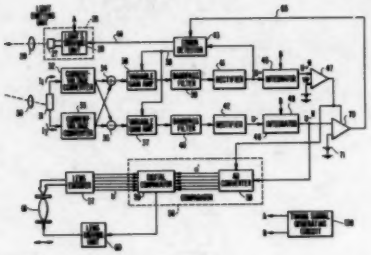
Claims priority, application Japan, Sep. 18, 1984, 59-195010; Sep. 18, 1984, 59-195011

Int. Cl.[4] G03B *3/10*

U.S. Cl. 354—403 **19 Claims**

1. An automatic focusing system for a camera, comprising: a light emitting unit which emits a distance measuring light beam; a condenser lens which condenses the reflective light among the light beam projected from the light emitting unit and reflected by an object; a light-spot detector disposed at the focal point of the condenser lens and capable of producing first and second photoelectric currents according to the position of the focused spot of said reflective light on the light receiving surface thereof and providing output signals corresponding to the first and second photoelectric currents, respectively; an arithmetic unit which processes the output signals of said light-spot detector through addition and subtraction; a first variable gain amplifier which amplifies an output signal of said

arithmetic unit corresponding to the sum of the output signals of said light-spot detector in response to a first control signal; a second variable gain amplifier which amplifies an output signal of said arithmetic unit corresponding to the difference between the output signals of said light-spot detector in response to the first control signal; first and second rectifying units which rectify the output signals of said first and second variable gain amplifiers, respectively; first and second integrators which receives the output signals of said first and second reclifying units, respectively, and provide integrated voltage signals corresponding to the output signals of said first and second rectifying units, respectively; a level decision unit which detects the level of the output signal of said first integrator; a lens encoder which detects the existing focusing position of a picture taking lens; a comparator which compares the



output signal of said second integrator and an output signal of said lens encoder; a lens driving unit which drives the picture taking lens according to the output signal of said comparator to an optimum focusing position; an error detector which receives a switching signal and said output signal of said first rectifying unit, and produces a second control signal for controlling the luminous flux density of said light emitting unit and said first control signal for controlling the respective gains of said first and second variable gain amplifiers, wherein the picture taking lens is driven by said lens driving unit so as to be stopped at an optimum focusing position until the output of said lens encoder coincides with a value corresponding to an output signal of said second integrator at a moment when said level decision unit decides that the output of said first integrator is equal to a fixed value.

4,673,275

CAMERA SYSTEM OPERABLE BY CARRYING DATA FROM A CAMERA ACCESSORY TO A CAMERA BODY

Masaaki Nakai, Nara; Masayoshi Sahara, Sennan, and Nobuyuki Taniguchi, Tondabayashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 478,910, Mar. 25, 1983, Pat. No. 4,560,267. This application Oct. 23, 1985, Ser. No. 790,511

Claims priority, application Japan, Mar. 26, 1982, 57-49768; Mar. 30, 1982, 57-52740; Apr. 1, 1982, 57-55187; Nov. 5, 1982, 57-194968; Feb. 2, 1983, 58-14929[U]

The portion of the term of this patent subsequent to Oct. 16, 2001, has been disclaimed.

Int. Cl.[4] G03B *7/00, 17/00*

U.S. Cl. 354—412 **2 Claims**

1. In a camera system operable by means of carrying data from a camera accessory to a camera body, the camera body comprising:

means for instructing an operation of carrying data from the camera accessory to the camera body;

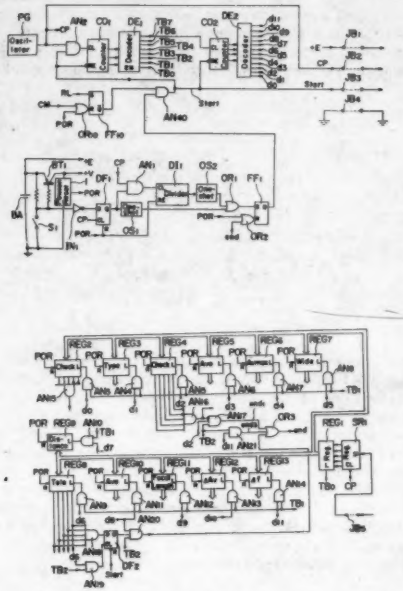
means for generating a predetermined number of clock pulses in each instruction of said instructing means;

means for transmitting said clock pulses to the camera accessory;

means for receiving the data from the camera accessory, each of the data consisting of a plurality of bits which are serially received by said receiving means one by one in synchronization with said clock pulses;

means for reading the data received by said receiving means in response to said clock pulses;

means for making said instructing means repeat the instruction at predetermined times, and



means, connectable to the camera accessory, for enabling the camera accessory to send, in response to the clock pulses, the data to the camera body during a time period when the instructing means is being made to repeat the instruction by the making means.

4,673,276

BLUR DETECTING DEVICE FOR A CAMERA

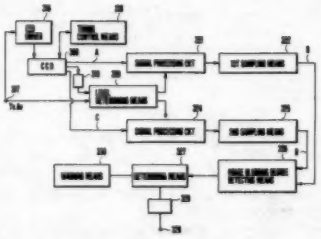
Shozo Yoshida, Tokyo, and Hiroshi Ohmura, Saitama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 22, 1985, Ser. No. 704,333

Claims priority, application Japan, Feb. 24, 1984, 59-34063; Feb. 24, 1984, 59-34064; Feb. 24, 1984, 59-34065; Feb. 24, 1984, 59-34066; Jun. 6, 1984, 59-114526

Int. Cl.[4] G03B *7/08*

U.S. Cl. 354—430 **4 Claims**



1. A blur detecting device for a camera, comprising:

a sensor having a function of photo-electric conversion upon receiving light from an object;

timing means for controlling output timing of said sensor at a first point of time and a second point of time in a photographing operation of the camera;

means for sampling an output signal of said sensor by a first threshold level at said first point of time and for sampling the output signal of said sensor by a second threshold level at said second point of time;

means for determining said first and second threshold levels of said sampling means based on information on a preset or computed shutter speed and/or a preset or computed aperture value; and

means for detecting an amount of blur in an image by outputs of said sampling means at said first point of time and said second point of time.

4,673,277

MULTI-PROGRAM CONTROL DEVICE FOR CAMERA

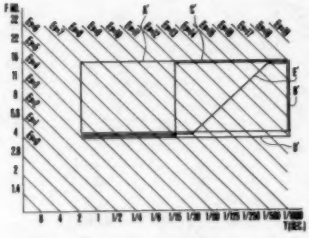
Hiromi Someya, Kanagawa; Yoshihiko Aihara, Tokyo; Toyokazu Mizogui, Kanagawa, and Nobuyuki Suzuki, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 559,220, Dec. 8, 1983, abandoned. This application Jan. 16, 1986, Ser. No. 820,873

Claims priority, application Japan, Dec. 9, 1982, 57-216333; Dec. 9, 1982, 57-216334

Int. Cl.[4] G03B *17/18, 7/08*

U.S. Cl. 354—474 **13 Claims**



1. A control device of a camera, comprising:

(a) plurality of discontinuous program lines having a combination of a shutter time and an aperture value determined by object brightnesses, said plurality of discontinuous program lines having different picture image effects obtainable from respective program lines;

(b) selecting means for selecting one program line out of said plurality of program lines, said means being able to select said one program line by operation from outside;

(c) display means for displaying the selected program line, said means displaying the picture image effect obtainable by said selected program line in pictographs and/or letters;

(d) signal generating means for generating an electrical signal corresponding to photographing information;

(e) means for determining whether the picture image effect to be derived from the selected program line is obtainable or not on the basis of the electrical signal from said signal generating means;

(f) means for forcibly varying a selected program line to another program line in said plurality of discontinuous program lines, said varying means being arranged to become operative when said determining means determines that the picture image effect is not obtainable; and

(g) display control means for controlling a display operation of said display means by an output of said determining means, said display control means varying a display state of said display means when said determining means determines that the picture image effect cannot be obtained, wherein said control means forces said display means to flicker at a first or second frequency, said flickering at the first frequency being forced when the picture image effect is not obtainable due to a photographing information of the photographing lens, while said flickering at the second frequency is forced when the picture image effect is not obtainable due to an object brightness information.

4,673,278

MIRROR DEVICE FOR A CAMERA

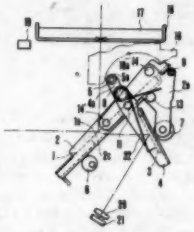
Tsuyoshi Fukuda; Masayuki Suzuki, and Masayoshi Kiuchi, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha

Filed Jun. 28, 1985, Ser. No. 750,754

Claims priority, application Japan, Jul. 6, 1984, 59-102158[U]; Jul. 6, 1984, 59-102159[U]; Jul. 11, 1984, 59-104979[U]; Jul. 11, 1984, 59-104980[U]

Int. Cl.[4] G03B *7/099, 19/12*

U.S. Cl. 354—479 **7 Claims**



1. A mirror device for a camera comprising:

(a) a first mirror arrangement including a first mirror arranged to swing from a finder-viewing position to an exposure position;

(b) a second mirror arrangement including a second mirror arranged to swing about a fulcrum on said first mirror arrangement;

(c) bias means urging said second mirror in an opening direction relative to said first mirror;

(d) position determining means mounted on said first mirror arrangement for adjustably determining the opening position of said second mirror including

(d-1) a contact portion which contacts said second mirror at said opening position, the contact between said second mirror and said contact portion being made by the urging of said bias means, and

(d-2) an adjusting mechanism for adjusting the opening angle of said second mirror relative to said first mirror while said second mirror and said contact portion are in contact; and

(e) a cam mechanism for moving said second mirror to the closing direction as said first mirror moves from said finder-viewing position to said exposure position.

4,673,279

DUPLEX COPIER

Ian G. Brown, Beds, United Kingdom, assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 617,306, Jun. 5, 1984, abandoned. This application Mar. 24, 1986, Ser. No. 844,250

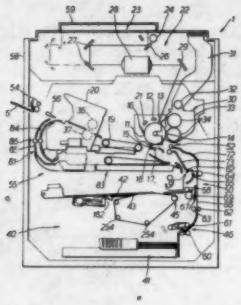
Claims priority, application United Kingdom, Jun. 8, 1983, 8315722

Int. Cl.[4] G03G *21/00*

U.S. Cl. 355—3 SH **11 Claims**

1. A copier for simplex or duplex copying in which for duplex copying copy sheets are fed in connecting copy sheet paths from a first copy sheet tray to a photoreceptor to receive a first image on one side and said copy sheets so simplexed are then fed to a duplex buffer tray from which they are refed to

the photoreceptor to receive a second image on the other side of the sheets to provide duplex copies, the improvement wherein said photoreceptor, said duplex buffer tray and said first copy sheet tray are all closely vertically superposed over one another with said duplex buffer tray arranged beneath said photoreceptor, and said connecting copy sheet paths convey said simplexed copy sheets unidirectionally along a double-



folded copy sheet path between the photoreceptor and the duplex buffer tray without sheet reversal, in which double-folded copy sheet path said simplexed sheets are naturally inverted twice and inserted into said duplex buffer tray lead edge first and in the same direction of movement in which they leave the photoreceptor, and are refed to the photoreceptor trail edge first, thereby providing compact folded connecting copy sheet paths for a horizontally compact duplex copier.

4,673,280

TRANSFER CHARGE CONTROL SYSTEM

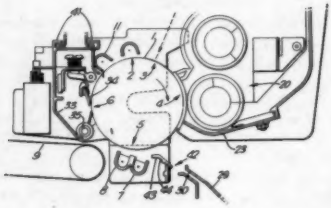
Derek J. Milton, Welwyn Garden City, England, assignor to Xerox Corporation, Stamford, Conn.

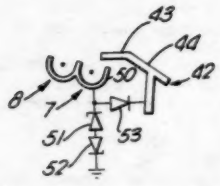
Filed Oct. 4, 1985, Ser. No. 783,998

Claims priority, application United Kingdom, Oct. 15, 1984, 8426044

Int. Cl.[4] G03G *15/16*

U.S. Cl. 355—3 CH **4 Claims**





1. Electrostatographic apparatus including transfer means for transferring a developed electrostatic latent image from an imaging surface onto a copy sheet, the transfer means comprising:

a transfer corotron, including a shield, operable for transfer of a developed image from the imaging surface to the copy sheet;

a conductive guide member extending into the region between the transfer corotron and the imaging surface, providing a spatial limitation of corona discharge produced by the transfer corotron and guiding copy sheets into contact with the imaging surface;

said shield being self-biasing to a first selected voltage;

said conductive guide member electrically connected to the shield of the transfer corotron, whereby a second selected voltage is provided on said conductive guide member;

means for maintaining said second selected voltage and a selected polarity on said guide member, said second selected voltage and polarity selected to approximate the surface voltage and polarity of a copy sheet during transfer.

4,673,281

IMAGE FORMING APPARATUS

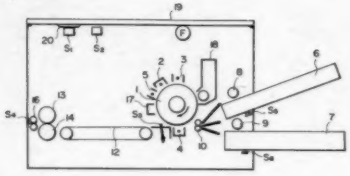
Akira Suzuki, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 451,261, Dec. 20, 1982, abandoned. This application Feb. 10, 1986, Ser. No. 828,062

Claims priority, application Japan, Dec. 29, 1981, 56-215325

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—14 R **7 Claims**



1. An image forming apparatus comprising:

means for registering a plurality of groups of image forming information data, wherein each group includes a plurality of selected image forming parameters;

image forming information entry means for entering said plurality of groups of said selected data to be registered by said registering means;

means for selecting and reading said groups of data;

means for changing the image forming information registered in said registering means; and

means for executing an image forming operation in accordance with a selected said group of image forming information data registered in said registering means as changed by said changing means.

4,673,282

ELECTROPHOTOGRAPHIC COPYING APPARATUS

Masakazu Sogame, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 28, 1985, Ser. No. 770,384

Claims priority, application Japan, Aug. 29, 1984, 59-181092

Int. Cl.[4] G03G *15/00*

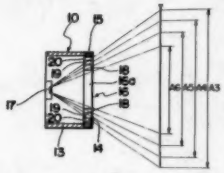
U.S. Cl. 355—14 E **14 Claims**

1. In an improved electrophotographic copying apparatus capable of reproducing copies of variable size original documents having a light source for illuminating the original document, means for projecting an image of the original document onto a photosensitive member and means for varying the image forming contrast for the copy to duplicate the original, the improvement comprising:

means for monitoring the light reflected from the original

document to produce signals to be applied to the varying means;

means for determining the size of the original document and producing a corresponding size signal; and



means for limiting the light transmitted to the monitor means in response to the size signal.

4,673,283

COPYING MACHINE

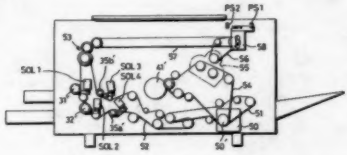
Masahiko Hisajima, Ikoma; Yutaka Shigemura, Takarazuka; Yoshinori Makiura, Tondabayashi, and Mitsuya Ishito, Sakai, all of Japan, assignors to Mita Industrial Co. Ltd., Osaka, Japan

Filed Mar. 27, 1985, Ser. No. 716,430

Claims priority, application Japan, Mar. 30, 1984, 59-64986

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—14 SH **5 Claims**



1. A copying machine which develops an electrostatic latent image corresponding to an original image into a toner image, transfers the toner image on a copying paper and fuses the toner image on the copying paper by a heating and fusing device, said machine comprises

a detection means for detecting types of copying papers,

a setting means for setting a first fixed standstill time in which an optical section halts after completing a scanning and exposing operation before beginning a restoring operation and for setting a second fixed standstill time in which the optical section halts after completing said restoring operation and before beginning a next scanning and exposing operation so as to provide a period during which the heating and fusing device is not supplied with a copying paper, and

a controlling means connected from the output of the detection means and to the input of the setting means for operating the setting means for fixing said standstill times by a detection signal supplied from the detection means showing that the copying paper is large in size as an input signal.

4,673,284

CLEANING DEVICE

Fuyuhiko Matsumoto, Wako, and Shuuichi Tsushima, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

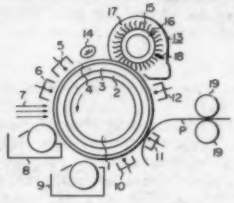
Filed Apr. 24, 1981, Ser. No. 258,033

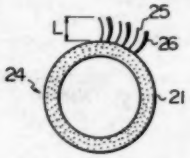
Claims priority, application Japan, Apr. 26, 1980, 55-55623

Int. Cl.[4] G03G *21/00*

U.S. Cl. 355—15 **17 Claims**

1. A cleaning device for removing residual toner particles from the insulating surface of an image bearing member of a device capable of forming copies in two colors, said residual toner particles including toner particles of two different colors with the toner particles of one color being charged to one polarity and the the toner particles of the other color being charged to the opposite polarity, comprising:





means including a rotatable cleaning brush having a plurality of fibers adapted to be moved in contact with the insulating surface of said image bearing member, said fibers being comprised of two kinds of fibers each kind adapted to be charged to a polarity opposite that of the other, and;

flicker means for flicking said brush to cause toner particles to be removed therefrom as the brush rotates.

4,673,285

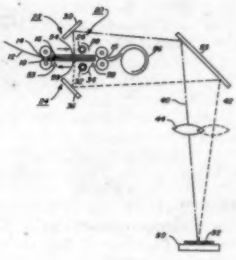
OPTICAL SCANNING OF DUPLEX DOCUMENTS

David K. Shogren, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 23, 1986, Ser. No. 867,359

Int. Cl.[4] G03B *27/32, 27/52*

U.S. Cl. 355—23 **10 Claims**



1. Apparatus for sequentially scanning both sides of a duplex document and for projecting line images along an optical path onto a light sensitive image member comprising, in combination:

a stationary transparent platen located in an object plane,

a first and second scan/illumination station positioned on opposite sides of said platen,

means for moving a duplex document across said platen in a first direction to provide a scan excursion adjacent the first side of the document and in a reverse scan direction

to provide a scan excursion adjacent the second side of the document,

means for energizing said first scan/illumination station at the start of said first scan excursion whereby reflected first side images are propagated along a first optical path,

means for energizing said second scan/illumination station at the start of said reverse scan excursion whereby reflected second side images are propagated along a second optical path,

a stationary projection lens for projecting and focusing document images on the surface of said light sensitive member, and

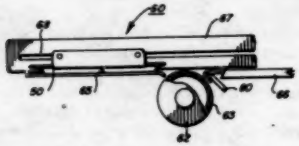
optical means positioned between the platen and said lens, said optical means adapted to sequentially direct said first and second side images along a common optical path into said lens, whereby said lens projects said images along a common optical path to said light sensitive member.

4,673,286

FRICTIONLESS VACUUM FEEDER FOR BOOK COPYING

Troy Shinbrot, Greenbelt, Md., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 20, 1985, Ser. No. 811,190
Int. Cl.⁴ G03B *27/32*
U.S. Cl. 355—25 **10 Claims**



1. A method for copying pages from a book, comprising the steps of:

(a) providing two platen surfaces with a vacuum roll positioned therebetween with an area of said vacuum roll in the same horizontal plane as the platen surfaces and extending transverse thereto;

(b) providing an air knife adjacent one side of said vacuum roll for supplying an air bearing as well as to separate pages of the book;

(c) capturing a page of the book by said vacuum roll;

(d) moving the book in said horizontal plane over said vacuum roll while simultaneously rotating said vacuum roll;

(e) reversing the rotation of said vacuum roll at the spine of the book to unwind the captured page while the book continues to be moved; and

(f) returning the book to its initial position after the captured page has been unwound.

4,673,287

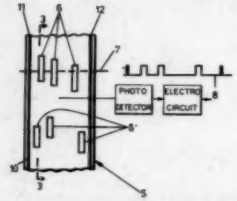
LASER-OPTICAL SURVEYING SYSTEM

Edmund Rickus, Oestrich-Winkel, Fed. Rep. of Germany, assignor to Nestle & Fischer, Fed. Rep. of Germany

Filed Jun. 6, 1984, Ser. No. 617,806
Claims priority, application Fed. Rep. of Germany, Jun. 18, 1983, 3321990
Int. Cl.⁴ G01C *3/08, 15/06*
U.S. Cl. 356—4 **4 Claims**

1. A surveyor's rod for a laser-optical surveying system wherein a laser beam rotates in a horizontal plane and is adapted to strike the rod having a receiving surface for the laser beam on substantially the entire side of the rod facing the incident laser beam, said receiving surface being formed by a photoelectrically sensitive layer which comprises

predetermined measuring ranges corresponding to the altitudes to be surveyed disposed on said receiving surface, each of said measuring ranges being marked by a different coding, said codings being formed by interruptions in the receiving surface, and



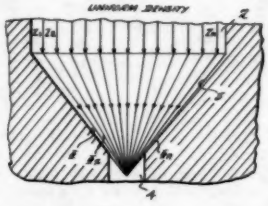
means for generating pulse sequences when the laser beam strikes the coding as well as the receiving surface, said pulse sequences being different from each other depending on the coding contacted by the laser beam.

4,673,288

FLOW CYTOMETRY

Richard A. Thomas, and Ross W. Eggleston, both of Miami, Fla., assignors to Ratcom, Inc., Miami, Fla.

Continuation of Ser. No. 263,882, May 15, 1981, abandoned.
This application Sep. 7, 1984, Ser. No. 648,356
Int. Cl.⁴ G01N *21/05*
U.S. Cl. 356—72 **23 Claims**



1. A flow transducer comprising means defining an aperture having an axis, said aperture having at least one flat side, means defining an inlet chamber and an outlet chamber immediately adjacent the aperture along its axis, said inlet and outlet chambers having walls disposed at an angle of at least 5° relative to the plane of the aperture, said inlet and outlet chambers at a distance from the aperture of twice the width of the aperture in a plane through its axis having cross-sectional areas at least 10 times the cross-sectional area of said aperture.

4,673,289

OPTICAL DEVICE WITH A HIGH COLLECTION EFFICIENCY AND CYTOFLUORIMETER MAKING USE OF THE SAME

Jean-Claude Gaucher, le Val St. Gerwain, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Jun. 17, 1985, Ser. No. 745,589
Claims priority, application France, Jun. 20, 1984, 84 09676
Int. Cl.⁴ G01N *21/05, 21/64*
U.S. Cl. 356—72 **16 Claims**

1. An optical device permitting at least one of the two following operations, namely

(a) the luminous excitation of an axial flow of material to be analyzed, said flow being directed along an axis and being able to emit light when said flow receives some light and

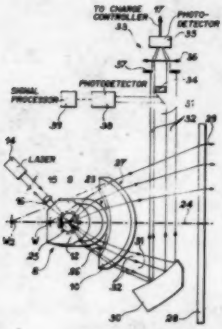
(b) the collection of light emitted by said flow,

said device comprising a first optical element and an analysis

chamber which chamber has a spherical shape, is formed within the first optical element and has a symmetry centre, said chamber being open at two diametrically opposite ends,

the first optical element having an inner concave spherical dioptre, an outer convex spherical dioptre, and an axis of symmetry passing through the symmetry centre of the chamber and

the first optical element being positioned in such a way that



the axis of the material flow passes through the two ends and the centre of the chamber,

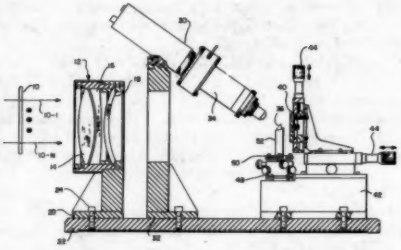
said optical device also comprising a second optical element having an inner concave dioptre, an outer convex dioptre and an axis of symmetry, said second optical element positioned in such a way that the inner dioptre of the second optical element faces the outer dioptre of the first optical element, and that the symmetry axis of the second optical element coincides with the symmetry axis of the first optical element.

4,673,290

DIAGNOSTIC APPARATUS AND METHOD FOR USE IN THE ALIGNMENT OF ONE OR MORE LASER MEANS ONTO A FIBER OPTICS INTERFACE

Steve A. Johnson, Tracy, Calif., and Robert R. Shannon, Tucson, Ariz., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 18, 1985, Ser. No. 692,747
Int. Cl.⁴ G01B *11/27*
U.S. Cl. 356—73.1 **11 Claims**



1. Diagnostic apparatus for use in the alignment of one or more beams onto a fiber optics interface, said diagnostic apparatus comprising

monitor means,

lens assembly means for imaging one or more of said laser beams passing through an aperture onto said fiber optics interface, said assembly means being slightly offset in an optical orientation from its center line optical axis, said lens assembly means including at least one lens where said one lens includes reflection means on the rear surface of said one lens such that when a minor scattering of said laser beams are reflected from said interface back to said lens assembly means, said reflection means on said one lens reflects, images and directs said scattered light toward said monitor means,

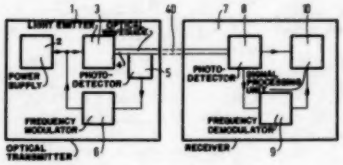
said monitor means being optically oriented to permit monitoring of said reflected light for indirect observation of the alignment of said focused laser beams onto said fiber optics interface.

4,673,291

METHOD OF AND DEVICE FOR MEASURING THE ATTENUATION IN OPTICAL WAVEGUIDES

Siegfried Heckmann, Wuppertal, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 21, 1985, Ser. No. 747,533
Claims priority, application Fed. Rep. of Germany, Jul. 12, 1984, 3425671
Int. Cl.⁴ G01N *21/84, 21/59*
U.S. Cl. 356—73.1 **10 Claims**



1. A method of measuring the attenuation of an optical waveguide, said method comprising the steps of:

injecting a light signal into a first end of an optical waveguide, said light signal passing through the waveguide and out a second end of the waveguide;

measuring the average input power of the light signal in the vicinity of the first end of the waveguide;

modulating the light signal, before it enters the first end of the waveguide, as a function of the measured average input power of the light signal, said modulated light signal having a substantially constant average input power;

measuring the average output power of the light signal at the second end of the waveguide;

demodulating the light signal at the second end of the waveguide to determine the average input power; and

comparing the demodulated measured average input power with the measured average output power and calculating the attenuation of the waveguide.

4,673,292

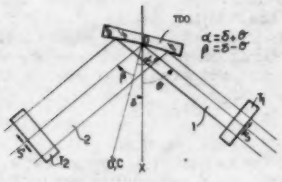
MONOCHROMATOR WITH A TELECENTRIC DISPERSIVE LENS

Michel Pouey, Viroflay, France, assignor to Centre National de la Recherche Scientifique, Paris, France

Filed Dec. 28, 1984, Ser. No. 687,256
Claims priority, application France, Dec. 30, 1983, 83 21139
Int. Cl.⁴ G01J *3/18*
U.S. Cl. 356—334 **10 Claims**

1. A monochromator comprising a spherical holographic grating with non-uniform line distribution produced by an holographic process for receiving a collimated incident beam at an angle α with respect to a normal of the grating, and for reflecting a collimated diffracted beam at an angle β with respect to the normal of the grating, the angle between the incident and reflected beams at a summit of said grating being $\alpha-\beta=2\theta$ such that $m\lambda=2\lambda_o \cos\theta$, m being the order of

diffraction and λ_0 being the recording wavelength of the hologram, a first source point being at the center of curvature O' of said spherical grating and a second source point being at infinity and inclined at an angle δ with respect to the normal to said grating, the angle δ being equal to that formed by the normal to the grating and the bisectrix of the angle 2θ wherein the



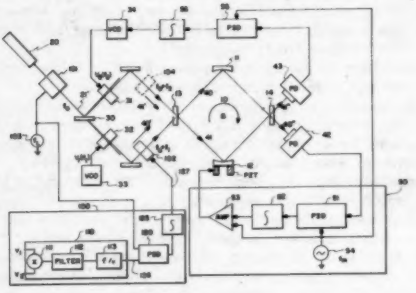
collimated diffracted beam at an angle β, with respect to the normal to the grating, is focused at the focus of a first telescope fitted with a straight first slit, the optical axis of the first telescope being merged with the direction of said diffracted beam and the slit being parallel to the direction of the lines of the grating.

4,673,293

PASSIVE CAVITY GYRO BIAS ELIMINATOR

Glen A. Sanders, Plymouth, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 31, 1985, Ser. No. 696,816
Int. Cl.[4] G01C *19/34*
U.S. Cl. 356—350 **9 Claims**



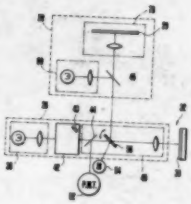
1. A passive ring resonator angular rate sensor comprising:
passive resonator means permitting the propagation of clockwise and counterclockwise beams of electromagnetic energy and having clockwise and counterclockwise resonant frequencies;
source means for introducing said clockwise and counterclockwise beams into said passive resonator means;
signal means responsive to said clockwise and counterclockwise beams for producing an output signal indicative of the difference between said clockwise and counterclockwise resonant frequencies;
means for determining an error signal related to variations in said output signal due to variations in the intensity difference between said counter-propagating beams; and
control means responsive to said error signal for altering the intensity of at least one of said counter-propagating beams so as to drive said error signal toward zero.

4,673,294

FILM THICKNESS MEASURING APPARATUS EMPLOYING MICROPROJECTOR OF SPECTRAL REFLECTION MEASUREMENT

Yoshihiro Mochida, Oume; Nobuo Adachi, Sagamihara, and Ichiro Shirahama, Chofu, all of Japan, assignors to ORC Manufacturing Co., Ltd., Tokyo, Japan

Filed Apr. 15, 1985, Ser. No. 723,567
Claims priority, application Japan, Sep. 20, 1984, 59-142398[U]
Int. Cl.[4] G01B *11/06*
U.S. Cl. 356—381 **5 Claims**



1. An apparatus for measuring the thickness of a film on certain material essentially comprising
a first light source for generating light beam to be emitted,
a first optical system for collecting thus emitted light beam,
a monochromator for spectrally transforming thus collected light beam in said first optical system to monochromatic light,
a second optical system for transmitting monochromatic light to be emitted to the surface of the film layer on the material,
a photomultiplier tube for outputting photoelectric current in proportion to the intensity of incident light reflected from the surface of the film layer, and
an optical projecting system comprising a third optical system optically associated with the second optical system, a second light source which is provided in the third optical system adapted to emit light beam to the surface of the film layer and a viewer for projecting an image of the film layer on the material in an enlarged scale by utilizing reflected light from the surface of the film layer.

4,673,295

METHOD AND AN APPARATUS FOR PERFORMING ROUTINE ANALYSES SUCH AS POLAROGRAPHIC OR SPECTROPHOTOMETRIC ANALYSIS

Erno Pungor; Klára S. Tóth; Zsófia Fehér; Géza Nagy, and György Horvai, all of Budapest, Hungary, assignors to Richter Gedeon Vegyészeti Gyár and Budapesti Müszaki Egyetem, both of Budapest, Hungary

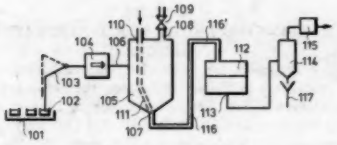
PCT No. PCT/HU83/00034, § 371 Date Feb. 1, 1984, § 102(e) Date Feb. 1, 1984, PCT Pub. No. WO84/00065, PCT Pub. Date Jan. 5, 1984
Continuation of Ser. No. 584,439, Feb. 1, 1984, abandoned. This PCT application Jun. 17, 1983, Ser. No. 850,431
Claims priority, application Hungary, Jun. 18, 1982, 1986/82
Int. Cl.[4] G01N *21/00*
U.S. Cl. 356—440 **2 Claims**

1. A method for performing polarographic analysis on a large set of sample solutions filled each into a separate sample cup, said sample cups being arranged on or formed in a sample cup holder such as a rotatable tablet, in the course of which the single samples to be analyzed in consecutive cycles are sucked out of the sample cup and transferred into a common vessel wherein removal of oxygen is performed, comprising the
(a) employing a vessel having an inlet and a lower outlet, an aspirating mouth and gas introductive means, communicating said vessel with a further receptacle such as analy-

zer cell or the ambent space over a conduit only if the sample level in the vessel is exceeding certain threshold level and below said threshold level communicating said vessel over said aspirating mouth in the upper part of the vessel communicating over a valve with the ambient space, said gas introducing means comprising a tube protruding into the vessel toward a bottom portion thereof and through which a gaseous medium is supplied continuously during all succeeding cycles of the analysis,

(b) employing a suction tube and coupling a fixed one end thereof to the inlet of the vessel, a free end of the suction tube being movable into two different working positions,

(c) a continuous suction effect is exerted on the fixed end of the suction tube during series of cycles, whereby said suction tube depending on its working position sucks up either the sample or ambient air, thereby a virtual restposition is created for said sample in said analyzer cell for performing the analysis,



(d) the free end of the suction tube in the first phase of the next cycle is moved into a first working position wherein the free end is dipping into the next sample cup positioned opposite to the suction tube after emptying said vessel, and in the second phase moved into a second working position wherein said free end is protruding into the ambient space, and

(e) performing at least the first step of the analysis after the level of the sample in the vessel exceeded a prescribed threshold level and, at the end of the first step of the analysis after completing said removal of the oxygen by said introduction of said gaseous medium an overpressure is established in the vessel, by closing said valve and communicating said aspirating mouth with the ambient space, whereby said sample is moved from said vessel into said polarographic cell,

(f) moving the suction tube during the first phase of the following handling cycle into its first working position and repeating this series of operations cyclically.

4,673,296

MIXING PUMP FOR TRANSPORT AND EFFECTIVE MIXING (HOMOGENIZATION) OF TWO OR MORE LIQUIDS (GASES) WITH A CONSTANT, BUT ADJUSTABLE, RATIO OF THE LIQUIDS

Arne B. Sjogren, Kirke Såby, Denmark, assignor to Dymo Science Inc., Tokyo, Japan

Filed Jul. 18, 1985, Ser. No. 756,378

Claims priority, application Denmark, Jul. 18, 1984, 3505

Int. Cl.[4] B01F *5/00, 15/02;* **B67D** *5/46*

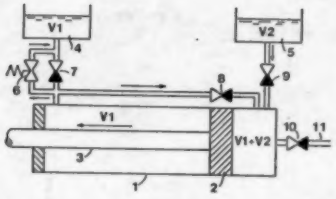
U.S. Cl. 366—159 **6 Claims**

1. A mixing pump for effectively mixing a constant ratio of at least first and second fluids supplied from respective fluid supply sources and transporting the mixture of the at least first and second fluids to a tank, said pump comprising:

a cylinder means having a piston means slidably fitted therein, said piston means being movable back and forth between a first position adjacent one end of said cylinder means and a second position adjacent the other end of the cylinder means;

said cylinder means having a first fluid inlet means operatively connected between the supply source of the at least first fluid and said one end of said cylinder means for supplying first fluid from supply source of the at least first fluid to the cylinder means between said piston means and said one end of the cylinder means when said piston means is moved from said first position to said second position and for allowing the at least first fluid between said piston means and said one end of the cylinder to leave said cylinder means when said piston means is moved from said second position to said first position;

said cylinder having a second fluid inlet means operatively connected between the supply source of the second fluid and said other end of said cylinder means for supplying second fluid from the supply source of the second fluid to the cylinder means between the piston means and said other end of the cylinder means when said piston means is moved from said second position to said first position;



a fluid mixing line operatively connected between said first fluid inlet means and said other end of said cylinder means for receiving the at least first fluid leaving the cylinder means from said first inlet means and for supplying the same to said other end of said cylinder means where the at least first fluid mixes with the second fluid to form a mixture when said piston means is moved from said second position to said first position; and

a fluid mixture outlet means located at said other end of said cylinder means for allowing the mixture of the at least first fluid supplied to said other end of said cylinder means by said fluid mixing line and the second fluid supplied to said other end of said cylinder means by said second fluid inlet means to pass from said cylinder means when said piston means is moved from said first position to said second position.

4,673,297

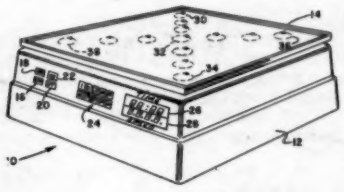
ORBITAL SHAKER

Roman W. Siczek, Chicago; William W. Stanley, Batavia, and Glenn E. Mikyska, Naperville, all of Ill., assignors to Cymatics, Inc., Naperville, Ill.

Filed Jul. 19, 1984, Ser. No. 632,574

Int. Cl.[4] B01F *11/00*

U.S. Cl. 366—208 **16 Claims**



1. Apparatus for imparting cyclical motion to articles, comprising:

a base;

a tray for supporting the articles and movable relative to said base;

drive means for effecting a predetermined cyclical motion of said tray; and

suspension means for supporting said tray on said base and for providing two-axis translational movement of said tray while preventing rotation thereof, said suspension means including a plurality of flexible supports loaded in tension and substantially inflexible in predetermined directions.

4,673,298

TIRE TEMPERATURE MEASUREMENT APPARATUS

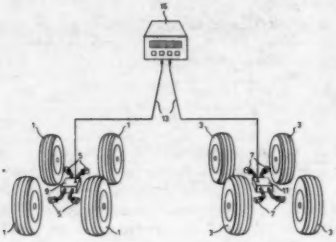
Ian Hunter, Essex; Graham Mason, Kent, and Michael Scorer, Hertfordshire, all of England, assignors to GEC Avionics Limited, England

Filed Jul. 3, 1984, Ser. No. 627,426

Claims priority, application United Kingdom, Jul. 11, 1983, 8318699

Int. Cl.[4] G01J *5/00*

U.S. Cl. 374—122 **10 Claims**



1. An apparatus for contactless measurement of the internal temperature of a vehicle tire consisting of rubber-type material and having a surface, comprising: a vehicle tire supporting structure mounted in a vehicle; a vehicle tire is aforesaid rotatively mounted on the structure and having an internal temperature; a microwave receiver mounted on the vehicle and sensitive to electromagnetic radiation in a waveband in the frequency spectrum 10 to 100 GHz and operative for generating a temperature signal indicative of the internal temperature within a predetermined volume deep within the vehicle tire; and a directional antenna mounted on the vehicle in proximity to the tire and having its output coupled to the receiver input and whose aperture and orientation relative to the vehicle tire are such that the antenna is responsive to radiation in the aforesaid waveband emanating substantially from said volume of the vehicle tire and leaving the vehicle tire through the surface of the vehicle tire.

4,673,299

TEMPERATURE MEASURING ARRANGEMENTS USING OPTICAL FIBRE SENSOR

John P. Dakin, Romsey, England, assignor to Plessey Overseas Limited, Ilford, England

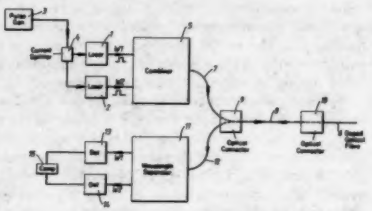
Filed Mar. 27, 1985, Ser. No. 716,662

Claims priority, application United Kingdom, Mar. 28, 1984, 8407945

Int. Cl.[4] G01J *5/02;* **G01N** *21/84*

U.S. Cl. 374—131 **13 Claims**

1. A temperature measuring arrangement comprising a relatively long optical fibre temperature sensor doped along its length with material that absorbs light in dependence upon temperature, means for launching into one end of the temperature sensor fibre two contemporaneous light pulses, each having a different wavelength, and means for comparing variations of levels of back-scattered light of the two different wavelengths returned along the sensor fibre, with respect to the time of return of said back-scattered light, in order to provide an indication of the temperature distribution along the



fibre, the two wavelengths correspond to different absorption wavelengths within the absorption band of the doped material.

4,673,300

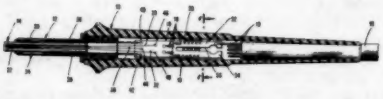
CALIBRATED PROBE FOR TEMPERATURE MEASURING

Jack L. Wilhelmson, and Lester B. Postlewait, both of Cheraw, S.C., assignors to Cooper Industries, Inc., Houston, Tex.

Continuation of Ser. No. 670,126, Nov. 9, 1984, abandoned, which is a continuation of Ser. No. 379,857, May 19, 1982, abandoned. This application Oct. 24, 1985, Ser. No. 790,659

Int. Cl.[4] G01L *7/10*

U.S. Cl. 374—182 **8 Claims**



1. A calibrated probe for measuring the temperature of an object with which said probe is contacted, comprising:

(a) a thermocouple in contact with said object for measuring the temperature of said object and having first and second leads;

(b) electronic circuitry for amplifying and displaying the temperature reading at said thermocouple, said circuitry being connected to said first lead of said thermocouple to define an output junction thereat; and

(c) a resistance temperature detector in close proximity to said output junction, said resistance temperature detector connected in series with said second lead of said thermocouple and comprising:

i. a wire;

ii. a frame having a pair of generally parallel legs with a space therebetween, said legs being adapted for movement relative each other, and

iii. a winding of said wire about said pair of legs, said wire being stretched longitudinally when said space between said pair of legs is widened to accomplish calibration of said thermocouple.

4,673,301

SUPPORTING MEMBER

Manfred Brandenstein, Eussenheim; Roland Haas, Hofheim, and Rudiger Hans, Niederwerrn, all of Fed. Rep. of Germany, assignors to SKF Kugellagerfabriken GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Feb. 27, 1984, Ser. No. 583,840

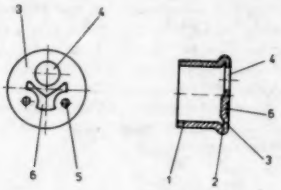
Claims priority, application Fed. Rep. of Germany, Mar. 30, 1983, 3311558

Int. Cl.[4] F16C *35/04;* **F16H** *7/10*

U.S. Cl. 384—428 **1 Claim**

1. In a supporting member for mounting a tension roller comprising a one-piece deep-drawn sheet metal housing

formed as a cylinder about a longitudinal axis with a bottom defining a generally radial plane transverse of said axis at one end of said cylinder, said bottom having an eccentric mounting bore; the improvement wherein said bottom has a diameter greater than that of said cylinder to define a radially outwardly extending flange at the junction of said bottom with said cylinder, said bottom having substantially constant thickness and having an embossed portion displaced from said bore axially



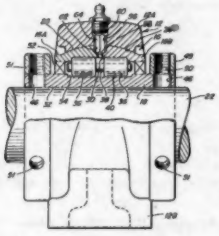
out of said radial plane whereby the stiffness of said bottom is increased, said bottom defining two additional bores spaced apart from each other and from said eccentrically displaced bores, said axially displaced portion being situated in part radially between said two additional bores and in part between said eccentric bore and said two additional bores, said axially displaced section having a generally Y shape with the stem of the Y between said additional bores, and said eccentrically disposed bore between the arms of said Y.

4,673,302

DOUBLE ROW CYLINDRICAL EXPANSION BEARING

Albert M. LaRou, Naperville, Ill., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Jun. 30, 1986, Ser. No. 880,044
Int. Cl.[4] F16C *19/28, 19/52, 25/08*
U.S. Cl. 384—548 **5 Claims**



1. A double row cylindrical axial expansion bearing comprising:

a housing or pillow block;

an outer race having a recessed generally cylindrical outer raceway therein of a first axial length;

a cylindrical inner race having a recessed generally cylindrical inner raceway therein of a second axial length, said recessed inner raceway being axially longer than said recessed outer raceway;

said inner race having a generally cylindrical bore adapted to surround a rotary shaft and to be connected therewith for rotation;

a double row of generally cylindrical rollers between and in rolling engagement with said recessed inner and outer raceways; and

a retainer for retaining said rollers in each row radially spaced from each other and each row axially spaced from the other row;

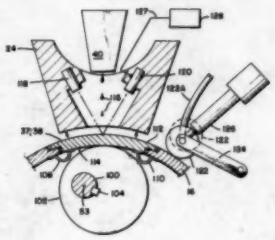
the axial length of said rollers in said double row being substantially equal to the axial length of said recessed outer raceway and smaller than the axial length of said recessed inner raceway thereby accommodating axial expansion of said rotary shaft relative to said rollers and said outer race and housing.

4,673,303

OFFSET INK JET POSTAGE PRINTING

Ronald P. Sansone, Weston; Antonio S. Cruz-Uribe, Cobalt, and Mike S. H. Chang, Danbury, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Oct. 7, 1985, Ser. No. 784,907
Int. Cl.[4] B41J *3/02, 29/40, 29/26*
U.S. Cl. 400—126 **25 Claims**



1. In a postage meter having a printing station and means for supporting at said printing station a document such as an envelope, label or the like that is to have postage indicia printed thereon, the improvement comprising:

an offset printing surface operably mounted in said meter;

a die plate carried by said offset printing surface including a first region formed with fixed information of the postage indicia such as the city and state and a second region for receiving thereon variable information of the postge indicia such as the date and postge amount;

means for applying ink to the fixed information on said first region;

an ink jet printing device that is adapted to project ink droplets onto said second region so as to form the variable information of the postage indicia;

said second region being movable between an operative position generally coplanar with said first region and an inoperative position depressed relative to said first region;

first means biasing said second region towards said inoperative position; and

second means biasing said second region against the force of said first means towards said operative position during certain portions of the printing operation.

4,673,304

THERMAL PRINTER RIBBON CARTRIDGE FOR WIDE RIBBONS

Dean-Yuan Liu, Canoga Park, and Albert A. Sholtis, Long Beach, both of Calif., assignors to Sanders Associates, Inc., Nashua, N.H.

Filed Aug. 13, 1985, Ser. No. 765,077
Int. Cl.[4] B41J *32/00*
U.S. Cl. 400—208 **25 Claims**

1. A print ribbon cartridge for slidable positioning endwise in a cartridge receptacle at the printing station of a printer, said cartridge comprising

A. a first casing section, said first section including

(1) a tube having a first longitudinal axis and two ends, at least one of which is axially open, and

(2) means defining a first slot in said tube which is parallel to said first axis;

B. a second casing section including

(1) a tubular portion having a second longitudinal axis and two ends, at least one of which is axially open, and

(2) means defining a second slot in said tubular portion which is parallel to said second axis;

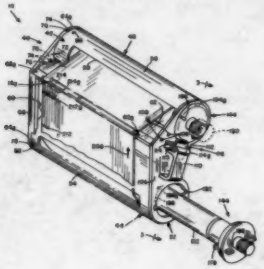
C. first and second connecting means for connecting together said one and the other ends of said tube and tubular portion respectively so that

(1) said first and second axes are parallel to one another and define a first plane, and

(2) said one end of said tube and tubular portion are positioned adjacent to one another at one end of the cartridge;

D. a ribbon turnbar

(1) integral to and projecting from said tubular portion,



(2) extending between corresponding outer edges of said first and second connecting means along a line spaced from said first plane so that, together with said second slot, said turnbar defines a second plane at the outermost extent of said cartridge which makes an acute angle with said first plane;

E. corresponding first support means secured to said first connecting means for rotatively supporting ribbon cores in said tube and tubular portion respectively;

F. corresponding second support means secured to said second connecting means for rotatively supporting ribbon cores in said tube and tubular portion respectively; and

G. means for rotating one of said support means.

4,673,305

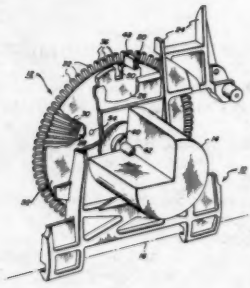
PRINTWHEEL FOR USE IN A SERIAL PRINTER

Richard G. Crystal, Los Altos, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 19, 1985, Ser. No. 811,062

Int. Cl.[4] B41J *1/30*

U.S. Cl. 400—460 **7 Claims**



1. A printwheel comprising a hub and a plurality of radially outwardly extending spokes, said spokes terminating in character pads bearing imprinting character surfaces facing the printing side of said printwheel and hammer receiving surfaces facing the hammered side of said printwheel, said printwheel being used in conjunction with a spoke alignment member which ramps said spokes out of the plane of said printwheel to a datum plane at which impact occurs, the improvement characterized by comprising

means for reducing wear and noise caused as said spokes are moved against said alignment member, said means for reducing wear and noise being secured to said hub, being unsecured to said spokes, and lying adjacent to said spokes, on said hammered side, said means for reducing wear and noise including a continuous ring having a wear resistant surface facing away from said spokes, said ring being sufficiently flexible to conform to and be contacted by said interfering spoke alignment member, being located to be interposed between said spoke alignment member and said spokes, and being located radially inwardly of said character pads.

4,673,306

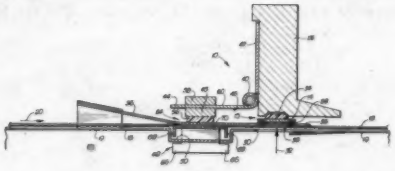
MAGNETIC PAPER CLAMP

Stanley Rubinstein, Sepulveda, and Stephen B. Baker, Saugus, both of Calif., assignors to Dataproducts Corporation, Woodland Hills, Calif.

Filed Jul. 11, 1984, Ser. No. 629,961

Int. Cl.[4] B41J *15/16*

U.S. Cl. 400—618 **5 Claims**



1. A paper clamp for clamping paper in a printer having a paper path defining the path of travel of the paper and a ribbon shield disposed adjacent the paper path, said clamp comprising:

a strip-shaped clamp plate made of ferromagnetic material and disposed on one side of the paper path and transverse to the direction of travel of the paper;

means for mounting the clamp plate to the printer to prevent substantial movement of the clamp plate in the direction of paper travel;

a longitudinal mounting member pivotally coupled to the printer on the other side of the paper path, said member having a pivot axis parallel to the clamp plate;

a strip-shaped spacer strip carried by the ribbon shield parallel to and disposed over the clamp plate;

a strip-shaped clamp magnet depending from one side of the mounting member, said mounting member being movable to a "clamp" position so as to position the clamp magnet adjacent the spacer strip and opposite the clamp plate to attract the clamp plate and clamp the paper, ribbon shield and spacer strip between the clamp magnet and the clamp plate as the paper travels through the paper clamp;

a stow magnet carried on the other side of the mounting member, said mounting member being movable to a "stowed" position so as to position the stow magnet adjacent the a portion of the printer away from the paper path to releasably fasten the mounting member to the printer portion and to stow the clamp magnet away from the paper path.

4,673,307

WASHING BRUSH WITH ADJUSTABLE HEAD

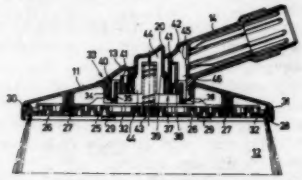
Erich Prestele, Voehringen; Alfred Schneider, Merklingen; Willi Hepperle, Westerstetten; Johann Katzer, Neu-Ulm; Christian Stephany, Ulm, and Franz Lopic, Nersingen, all of Fed. Rep. of Germany, assignors to Gardena Kress & Kastner GmbH, Fed. Rep. of Germany

Filed Jul. 10, 1985, Ser. No. 753,390

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1984, 3426748

Int. Cl.[4] A46B *11/00, 11/06*

U.S. Cl. 401—289 17 Claims



1. A fountain brush, comprising:

a cover;

a tubular gripping member extending from the cover, the gripping member being attachable to a source of water and defining a path for water from the source to the cover;

a hollow brush body rotatable about an axis with respect to the cover and having a base plate provided with openings for discharging the water, and bristles; and,

a spring loaded pressure releasing locking member displaceably fixed in the cover adjacent said gripping member, the locking member being axially displaceable relative to the cover and relative to the brush body, the locking member being rotationally fixed to the cover, and rotationally fixed to the brush body except when the locking member is axially displaced, the locking member cooperating with the brush body for locking the brush body to the gripping member, the brush body being provided on a surface thereof receiving the cover with a circular opening which engages a circular edge of the cover, and the locking member being arranged approximately at the axis in the center of the brush body and the locking member and the brush body having engagable teeth forming a locking device at the edge of the opening, the locking device being disengagable by axial displacement of the locking member relative to the cover and the brush body thereby disengaging the engagable teeth.

4,673,308

HINGE MECHANISM FOR USE WITH FOLDING STRUCTURES

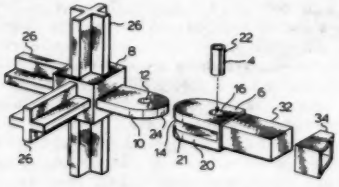
Frederick W. Reilly, Toronto, Canada, assignor to Miranda Investments Limited, Toronto, Canada

Filed May 22, 1986, Ser. No. 865,630

Claims priority, application Canada, Nov. 29, 1985, 496613

Int. Cl.[4] F16B *7/00*

U.S. Cl. 403—172 7 Claims



1. A hinge mechanism for use with a folding structure, which comprises a corner joint with at least one flange extending therefrom, a pivotal support means, and a securing means to pivotal secure said corner joint to said support means,

said corner joint consisting of a block and said at least one flange extending from said block, said flange having a rounded outer end and an aperture extending therethrough;

said pivotal support means having a pair of arms for securing said flange therebetween, said pair of arms having an aperture extending therethrough, and said pivotal support means further including at least one flange extending outwardly from the sides of one of said arms, said flanges for supporting a display means; and

said securing means consisting of a split pin to fit through the aperture of said flange and through the aperture in said arms to pivotally secure said corner joint to said support means.

4,673,309

METHOD AND APPARATUS FOR ANCHORING CABLES OF HIGH-TENSILE STEEL WIRE

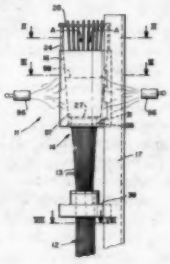
Jörg Schlaich, Hagenbergsteige 63d, 7000 Stuttgart 1, and Rudolf Bergermann, Laustrasse 60, 7000 Stuttgart 70, both of Fed. Rep. of Germany

Filed Dec. 24, 1984, Ser. No. 685,705

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1984, 3435118

Int. Cl.[4] F16G *11/05*

U.S. Cl. 403—265 15 Claims



An apparatus for anchoring cables, bundles of wires or strands, or the like, of preferably high-tensile steel wire comprising:

at least one fixed anchoring socket having a front end and a back end and including an inner surface defining a cone, wherein an associated end of the cable or bundle is twisted open such that it forms a cone approximately identical to the cone defined by the inner surface of the anchoring socket;

a metallic cast body inserted between the opened or spread-apart wires or strands; and

a perforated template disposed on the front end of the anchoring socket into which the spread-apart wires or strands can be threaded.

4,673,310

METHOD OF AND APPARATUS FOR ADJUSTABLY LEVELING MANHOLE COVERS, GRATES AND THE LIKE

Francis LeBaron, West Bridgewater, Mass., assignor to E.L. LeBaron Foundry Co., Brockton, Mass.

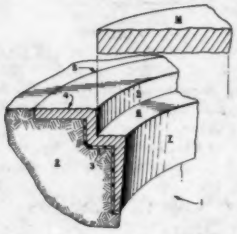
Continuation of Ser. No. 551,583, Nov. 14, 1983, abandoned. This application Mar. 24, 1986, Ser. No. 843,931

Int. Cl.[4] E02D *29/14*

U.S. Cl. 404—26 20 Claims

1. Apparatus for providing adjustable leveling of manhole covers, grates and the like within ground and similar structures, which comprises a substantially annular ring for supporting a cover, grate and the like near its upper edge, said ring having a substantially annular wall portion with a non-tapered

outer surface disposed within an interior wall of a hole in the ground or similar structure and extending deep into said hole from an upper lip of said interior wall, and mechanically compressible resilient layer means shaped to conform to said non-tapered outer surface of said annular wall portion of said ring and disposed within said hole in abutment between said interior wall of said hole and said non-tapered outer surface of said annular wall portion of said ring for reducing sliding friction between said outer surface of the annular ring and the ground or similar structure when the annular ring is vertically displaced within the ground or similar structure in order to adjust the level of the manhole cover, grate and the like, said resilient layer means extending deep into said hole from said upper lip of said interior wall and along the length of said non-tapered outer surface.



15. A method of installing adjustable leveling manhole covers, grates and the like within ground and similar structures, which comprises, creating a hole in the ground or similar structure that has an interior wall which is somewhat larger in cross dimension than the outer dimensions of a manhole cover-receiving annular ring which has an annular wall portion with a non-tapering outer surface of sufficient length to extend deep within said hole, inserting the ring within the hole in such a manner that said annular wall portion of said ring is disposed within said interior wall and extends deep into said hole from a position adjacent an upper lip of said interior wall, and positioning a compressible resilient material between the interior wall of the hole and said nontapered outer surface of the annular wall portion of the ring in such a manner that said material extends into said hole along the length of said outer surface from said upper lip of said interior wall, to compress said material between the length of said outer surface and the interior wall of the hole.

4,673,311

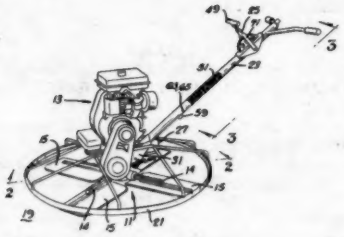
CONCRETE FINISHING MACHINE HAVING COUNTERBALANCED BLADE PITCH ADJUSTMENT APPARATUS

Whiteman, Jr. Marvin E., 2254 Braniff St., Boise, Id. 83706

Filed Jul. 2, 1985, Ser. No. 751,606

Int. Cl.[4] E01C *19/22*

U.S. Cl. 404—112 **25 Claims**



1. A concrete finishing machine comprising:

a rotatable trowel blade assembly having a pluraity of substantially planar trowel blades in circumferentially-spaced arrangement, wherein the blades are adapted to rest on a concrete surface and support substantially the entire weight of the machine;

an elongated, tubular machine handle; and

adjustment means for controllably pivoting the trowel blades about their respective radial axes, to adjust their pitch relative to the concrete surface on which the blades rest and thereby raise or lower the machine on the surface correspondingly, the adjustment means including

control means including a control handle,

means interconnecting the control means and the trowel blade assembly, wherein positioning of the control handle effects a corresponding pivotal positioning of the trowel blades, and

counterbalancing means located within the tubular machine handle and operatively connected to the control handle, for applying a counterbalancing force to the control handle comparable to the force applied to the control handle by the

interconnecting means, whereby the control handle can be controllably positioned with substantially less force than otherwise would be required,

wherein the control means is configured such that the control handle and trowel blade pitch remain fixed except when the control handle is selectively repositioned.

4,673,312

METHOD AND APPARATUS FOR THE UNDERGROUND INSTALLATION OF PIPELINES

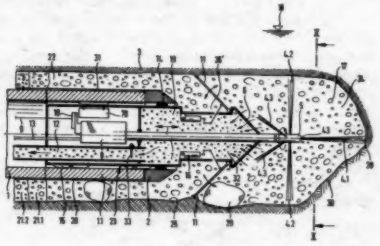
Manfred Nussbaumer, Leonberg, Fed. Rep. of Germany, assignor to Ed. Züblin Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed May 24, 1985, Ser. No. 738,029

Claims priority, application Fed. Rep. of Germany, May 25, 1984, 3419517

Int. Cl.[4] F16L *1/02;* **E21B** *7/18;* **E21D** *9/10*

U.S. Cl. 405—184 **37 Claims**



1. A method for the underground installation of pipelines, comprising the steps of driving pipe sections with an outer diameter into solid ground, loosening the earth in the ground at the driving face by breaking it up, pulverizing it, or boring it exclusively by means of liquid jet means having an effective working diameter that is greater than the outer diameter of the pipe sections being driven into the ground while liquid is discharged from a nozzle head of the jet means at high pressure and high speed, and transporting the excess earth backwards, from a removal zone disposed between said driving face and a removal device, through said pipeline for removal or treatment; the improvement therewith comprising the steps of:

forming, in said loosening step, an earth-liquid mixture of loosened earth and liquid from said jet means so that earth-liquid mixture is located in advance of direction in which said driving of pipe sections into the ground occurs;

removing only so much of said earth-liquid mixture from said removal zone such that the latter remains adjusted and progressively completely filled with earth-liquid mixture during said driving of pipe sections;

leaving an annular displacement space between pipe sections and the ground; and

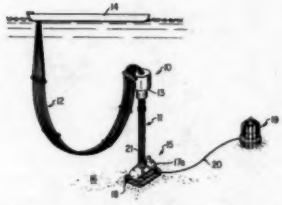
forcing larger earth aggregates and obstructions in the ground outwardly into the annular displacement space.

4,673,313

MARINE PRODUCTION RISER AND METHOD FOR INSTALLING SAME

Benton F. Baugh, Houston, and Narayana N. Panicker, Dallas, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 11, 1985, Ser. No. 722,026
Int. Cl.[4] E21B 7/12
U.S. Cl. 405—195 13 Claims



1. A riser bottom connector system for connecting the lower end of a marine riser to the marine bottom, said system comprising:

a landing base adapted to be set on said marine bottom, said base comprising:

a template;

at least one connector head on said template adapted to be connected to the production from a subsea well;

a landing mandrel attached to and extending vertically upward from said template and;

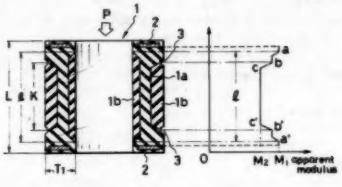
an inverted cone cover plate attached through its apex to said landing mandrel and extending outward and downward therefrom whereby said cover plate overlies said at least one connector head; said cover plate having at least one opening therethrough which is vertically aligned over said at least one connector head.

4,673,314

BUCKLING FENDER

Yoshiaki Hara, Hadano, and Masashi Wakabayashi, Kokubunji, both of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Filed May 30, 1985, Ser. No. 739,336
Claims priority, application Japan, Jun. 30, 1984, 59-135851
Int. Cl.[4] E02B 3/22
U.S. Cl. 405—215 10 Claims



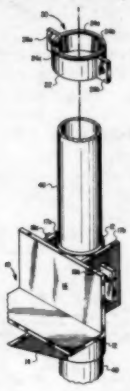
1. A buckling fender comprising a hollow cylindrical body molded from at least two rubber-like elastic materials differing in modulus of elasticity for compression axially of said cylindrical body, said at least two rubber-like elastic materials being laminated to each other in said body so that an apparent modulus of elasticity at a central part of said cylindrical body in said compression axial direction of said body is lower than the apparent modulus of elasticity at both end portions in said compression axial direction.

4,673,315

APPARATUS FOR RAISING AND SUPPORTING A BUILDING

Robert R. Shaw, 908 Elmwood Dr., Edmond, Okla. 73034, and Steven D. Gregory, 301 E. Main, Ada, Okla. 74820

Filed Aug. 16, 1985, Ser. No. 766,775
Int. Cl.[4] E02D 17/02
U.S. Cl. 405—230 7 Claims



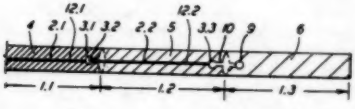
1. An apparatus for raising and supporting the foundation or slab of a building, said apparatus comprising means for engaging the lower surface of said foundation or slab, said engaging means including a tubular guide means; a pipe assembly extending through said guide means and having an upper portion extending above said guide means and a lower portion extending into the ground; clamp means extending around said upper portion of said pipe assembly; and hydraulic ram means connected between said engaging means and said clamp means, respectively in the expanded position of ram assemblies; and means for actuating said ram means to retract same and drive said pipe assembly into the ground until said pipe assembly encounters a predetermined resistance, said actuating means adapted to further actuate said ram means after said predetermined resistance is encountered to raise said foundation or slab a predetermined distance.

4,673,316

METHOD FOR FABRICATING SLOTTED WALLS WITH BUILT-IN THIN-WALLED SEALING ELEMENTS

Manfred Nussbaumer, Leonberg; Eberhard Gläser, Aichwald, and Eberhard Beitinger, Stuttgart, all of Fed. Rep. of Germany, assignors to Ed. Züblin Aktiengesellschaft, Stuttgart-Mohringen, Fed. Rep. of Germany

Filed Dec. 6, 1985, Ser. No. 806,109
Claims priority, application Fed. Rep. of Germany, Dec. 7, 1984, 3444681
Int. Cl.[4] E02D 5/20
U.S. Cl. 405—267 13 Claims



1. A method for fabricating a vertical barrier in the soil, comprising the steps of:

excavating in the soil a hole in the form of a first vertically

oriented slot, said slot being contiguous with a previously formed slotted wall section;

forming a second vertically oriented slot of smaller width than said first vertically oriented slot and extending therefrom through a hardening wall mass of said previously formed slotted wall section to a slotted connecting tube attached along a vertical edge of a first planar sealing element disposed in said hardening wall mass of said previously formed slotted wall section;

filling said first and said second vertically oriented slot with a support suspension;

placing a second planar sealing element into the suspension in said first and said second vertically oriented slot, said step of placing including the step of introducing a plug connection disposed along a vertical edge of said second planar sealing element into said slotted connecting tube; and

forming a hardened wall mass in said first vertically oriented slot.

4,673,317

SHAPER CUTTER WITH REPLACEABLE CUTTING WAFER

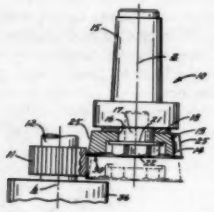
Edward W. Haug, Rockford, Ill., assignor to Barber-Colman Company, Rockford, Ill.

Continuation-in-part of Ser. No. 615,775, May 31, 1984, Pat. No. 4,576,527, which is a continuation-in-part of Ser. No. 515,795, Jul. 21, 1983, abandoned. This application Feb. 10, 1986, Ser. No. 827,648

The portion of the term of this patent subsequent to Mar. 18, 2003, has been disclaimed.

Int. Cl.⁴ B23F *21/28*

U.S. Cl. 407—28 **6 Claims**



1. A tool for cutting metal, said tool comprising an elongated body having a circular cross-section and a forward end surface, a plurality of radially projecting teeth formed on the periphery of said body adjacent said forward end surface and spaced angularly around said body, a thin sheet metal wafer disposed in face-to-face relation with said forward end surface of said body and having a plurality of radially projecting cutting teeth spaced angularly around its periphery, the number of cutting teeth on said wafer being equal to the number of teeth on said body, each cutting tooth on said wafer being alined angularly with one of the teeth on said body, the cutting teeth on said wafer being larger at their ends, sides and roots than the corresponding teeth on said body whereby the cutting teeth on the wafer extend slightly beyond the ends, sides and roots of the teeth on said body, bonding means located between said wafer and the forward surface of said body for bonding said wafer in rigid face-to-face relation with said forward surface whereby the cutting teeth on said wafer are backed by the teeth on said body and are operable to cut a workpiece as said body is advanced forwardly.

4,673,318

HAND TOOL MACHINE, IN PARTICULAR DRILLING MACHINE

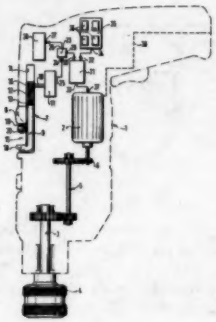
Friedrich Hornung; Kurt Paule, both of Stuttgart, and Fritz Schädlich, Leinfelden-Echterdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Sep. 12, 1983, Ser. No. 531,592

Claims priority, application Fed. Rep. of Germany, Oct. 7, 1982, 3237158

Int. Cl.⁴ B23B *45/02*; H02P *7/28*

U.S. Cl. 408—9 **45 Claims**



1. A hand tool machine for driving a tool element having a diameter, comprising: a housing; a clamping element connected to said housing for receiving the tool element; means for driving the tool element; means for determining the diameter of the tool element with a changeable speed, said determining means including a feeler member, which is arranged to receive the tool element for sensing the diameter of the tool element, said determining means with said feeler member being located at a predetermined part of said housing separate from said clamping element so as to determine the diameter of the tool element when the latter is not received in said clamping element so that the determination of the diameter of the tool element takes place directly in the housing and at the same time separately from said clamping element; and controlling means connected with said feeler member and for controlling said driving means so as to change the speed of said driving means and thereby to change the speed of the tool element in dependence on the diameter determined by said feeler member.

4,673,319

MAJOR-MINOR TOOL SHANK FOR MACHINE TOOL

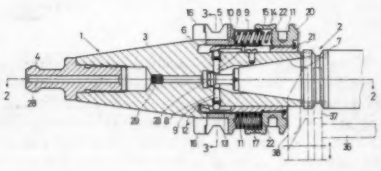
Kazutomi Ishikawa, Okayama, Japan, assignor to Mori Machinery Co., Ltd., Okayama, Japan

Filed Feb. 11, 1986, Ser. No. 828,498

Claims priority, application Japan, Feb. 16, 1985, 60-28594

Int. Cl.⁴ B23C *9/00*

U.S. Cl. 409—234 **4 Claims**



1. A major-minor tool shank for a machine tool comprising: a major tool shank having a tapered portion which matches

the tapered portion of a spindle, said major shank also having a tool grip portion;

a minor taper pot whereto a minor tool shank is to be inserted;

lock pin holes and lock pins provided at the bottom portion of the minor taper pot; and

a lock sleeve movable in the axial to actuate said lock pins, said sleeve being held elastically by means of spring along the outer circumference of the minor taper pot.

4,673,320

ANCHOR DOWEL ASSEMBLY

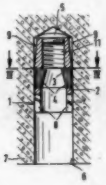
Peter Froehlich, Neuried, Fed. Rep. of Germany, assignor to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein

Filed Apr. 24, 1986, Ser. No. 855,798

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1985, 3514955

Int. Cl.[4] F16B *13/04*

U.S. Cl. 411—21 **4 Claims**



1. Anchor dowel assembly for insertion into a borehole formed in a receiving material comprising an axially elongated sleeve having a first end and a second end spaced apart in the axial direction thereof with the first end arranged to be inserted first into the borehole and said sleeve forming an axially extending bore located between the first and second ends thereof, said sleeve having an outside surface and a wall thickness extending between the surface forming the bore and the outside surface, a plurality of window-like openings formed through said sleeve and located between said first and second ends thereof, locking member mounted in said window-like openings formed through said sleeve and located between said first and second ends thereof, locking members mounted in said window-like openings and arranged to radially outwardly dispalceable from a first position where said locking members extend radially inwardly into the bore in said sleeve to a second position where the locking members extend radially outwardly from the outside surface of said sleeve, said locking members having a dimension in the radial direction thereof greater than the wall thickness of said sleeve, wherein the improvement comprises that said locking members each have a surface extending in the axial direction of said sleeve and located within the bore in said sleeve in the first position thereof, an expansion tool insertable into the bore of said sleeve from the second end thereof into engagement with the surface of said locking members within the bore in said sleeve for radially displacing said locking members outwardly through said window-like openings so that said locking members project radially outwardly from the outside surface of aid sleeve, said expansion tool arranged to receive a force for displacing said expansion tool at least in the direction toward the first end of said sleeve, said expansion tool is in interfitting engagement with said sleeve so that said expansion tool can be rotated and thereby otate said sleeve, the connection between said sleeve and said expansion tool comprises guide means mounted in said epxansion tool and engageable with said sleeve, said expansion tool comprises an axially extending first section located closer to the first end of said sleeve and an axially extending second section extending from said first section toward the second end of said sleeve, said first section having a conically shaped outside surface, and said second section including said guide means, said guide means comprises a plate having a pair of opposite flat surfaces extending in the axial direction of said sleeve with said plate fitted into said second section of said expansion tool, said sleeve having axially extending slits therein, and said plate being engageable within said slits in said sleeve.

4,673,321

EXPANSION DOWEL

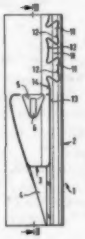
Armin Herb, Peissenberg; Robert Huegel, Kaufering, both of Fed. Rep. of Germany, and Rudolf Leuthi, Niederwangen, Switzerland, assignors to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein

Filed Feb. 26, 1986, Ser. No. 833,916

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1985, 3506841

Int. Cl.[4] F16B *13/04*; E21D *20/00*

U.S. Cl. 411—40 **11 Claims**



1. Expansion dowel comprising an axially extending expansion sleeve including an expansion member rolled from a section of sheet metal, said expansion sleeve having a leading end arranged to be inserted first into a borehole formed in a receiving material and a trailing end, the rolled said sleeve having a pair of edges extending in the leading end-trailing end direction and forming a butt joint, a thread formed on the inside surface of the said sleeve extending from the trailing end to a location intermediate the trailing end and the leading end, said sleeve having an opening therein extending in the axial and circumferential direction with the opening converging in the axial direction toward the leading end, and said expansion member located within said opening, wherein the improvement comprises at least one of said edges having a recess formed therein extending in the circumferential direction from said edge and the other said edge having a tang extending therefrom in the circumferential direction of said sleeve so that said tang fits in interengagement in said recess when said edges from the butt joint, said expansion member is secured to said sleeve by a breakable web, and said expansion member has an inwardly directed projection extending into the interior of said sleeve so that an installation tool can be inserted from the trailing end of said sleeve against said projection for effecting the separation of said expansion member at said web from said sleeve and for displacing said expansion member within the opening in said sleeve in the direction toward the leading of said sleeve.

4,673,322

SLOTTED ANCHORING BUSH

Erwin Schiefer, Munich, Fed. Rep. of Germany, assignor to Hilti Aktiengesellschaft

Filed Jul. 29, 1986, Ser. No. 891,364

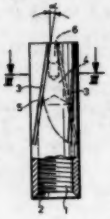
Claims priority, application Fed. Rep. of Germany, Jul. 29, 1985, 3527092

Int. Cl.[4] F16B *13/04, 13/06*

U.S. Cl. 411—40 **10 Claims**

1. An anchoring bush comprising an axially extending member having a first end and a second end spaced apart in the axial direction and a generally cylindrically shaped outer surface between said first and second ends, a blind borehole formed in said member in the axial direction thereof from the second end

toward the first end, said blind borehole having a base intermediate said first and second ends, means in said blind borehole for securing a fastening member to said anchoring bush, at least three slots formed in said member extending from the first end thereof toward the second end, each of said slots being located



in a different plane inclined at an oblique angle to the axis of said member, said slots being located outwardly from said blind borehole, said slots being in intersecting relation in the axial direction of said member with each of said slots extending inwardly from the said outer surface and intersecting at least another one of said slots.

4,673,323

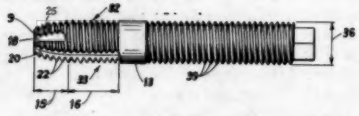
SELF TAPPING STUD

Peter Russo, 719 Nut Plains Rd., Guilford, Conn. 06437

Filed Apr. 7, 1986, Ser. No. 848,939

Int. Cl.⁴ F16B *25/02*

U.S. Cl. 411—387 **5 Claims**



1. A dual function tap and stud device, comprising:

a tap member (**11**) having a tapered end portion (**15**) with a plurality a tapered tap threads (**21**), and having a uniform portion (**16**) with a plurality of uniform diameter tap threads (**34, 35**), a first pair of "L" shaped dimetrically spaced grooves (**17, 18**) each having a length approximately equal to the length of said tapered end portion, a second pair of "L" shaped diametrically spacer' grooves (**19, 20**) each having a length approximately equal to the length of said tap member, said tapered tap threads each having a generally sharp thread portion (**21**) and a plurality of substantially pointed tapered tip cutting edges (**24, 25, 26, 27**), said uniform diameter tap threads each having a generally sharp thread portion (**34, 35**) and a plurality of uniform diameter and substantially pointed thread tip cutting edges;

an intermediate shank portion (**13**); and

a stud member (**12**) having a third plurality of generally uniform threads (**39**).

4,673,324

METHOD AND SHEET FOR BINDING PAGES

Gary R. Hanson, and George R. Rabuse, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 19, 1986, Ser. No. 864,527

Int. Cl.⁴ B42B *5/00*; B42C *9/00*; B42F *1/00*

U.S. Cl. 412—6 **13 Claims**

1. A binding sheet for binding loose pages of known width and thickness together along one marginal edge comprising

a sheet of material having two longitudinally extending edges, said edges being spaced from each other, at least one longitudinal edge of said sheet having a value of flexural rigidity of between 6×10^{-3} to 5×10^{-5} inch pounds, and a narrow band of adhesive coated on one surface of said sheet and along said at least one longitudinal edge, said band of adhesive having a width defined by the formula

$$A_w=\pi t(N_{Max}+1)+T_{po}$$

where:

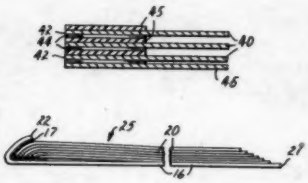
A_w=the adhesive width

t=the known thickness of each page

N_{Max}=a predetermined maximum number of pages to be bound on the sheet

T_{po}=a predetermined minimum overlap of the adhesive on the marginal edge of the top page when binding the maximum number of pages.

11. A pad of binding sheets for binding together along one marginal edge a plurality of loose pages each of a known width and thickness comprising a plurality of sheets of material each



having at least one longitudinal edge having a value of flexural rigidity of between 6×10^{-3} to 5×10^{-5} inch pounds, a narrow band of adhesive coated on one surface of each of said sheets of material along said at least one longitudinal edge, said band of adhesive having a width defined by the formula

$$A_w=\pi t(N_{Max}+1)+T_{po}$$

where:

A_w=the adhesive width

t=the known thickness of each page

N_{Max}=a predetermined maximum number of pages to be bound on each sheet

T_{po}=a predetermined minimum overlap of the adhesive on the marginal edge of the top page when binding the maximum number of pages

and a low adhesion coating on the surface of each of said sheets of material opposite said one surface and opposite said band of adhesive, said sheets being stacked one sheet above the other with the band of adhesive on one sheet in contact with said low adhesion coating on the adjacent sheet.

4,673,325

GRIPPER APPARATUS FOR STACKING A BATCH OF SHEETS

John J. Jago, Liverpool, England, assignor to Pilkington Brothers P.L.C., Merseyside, England

Filed Jan. 22, 1986, Ser. No. 821,000

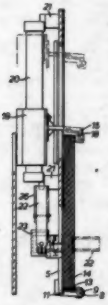
Claims priority, application United Kingdom, Feb. 1, 1985, 8502577

Int. Cl.⁴ B65G *57/28*

U.S. Cl. 414—103 **21 Claims**

1. Gripper apparatus for stacking a batch of sheets comprising a gripper head having a sheet support for movement into position relative to a batch of sheets to be gripped, lower support means for the bottom of the batch, a stop associated with said lower support means and spaced from said sheet support for engaging behind one face of the batch of sheets, at least one clamp movable relative to said sheet support for

engaging the batch to grip the batch against said sheet support between that clamp and said lower support means, tilting means associated with said lower support means at the bottom of said sheet support, and means for operating said tilting



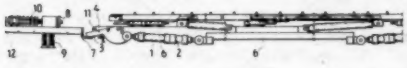
means, when the gripper head is in a substantially vertical stacking position, to cause said tilting means to come from beneath said lower support means and lift the batch of sheets from said lower support means and over the stop as the batch is stacked.

4,673,326

BRIDGE AND STOPPER MECHANISM FOR AN APPARATUS FOR LATERAL TRANSFER OF ROLLER PALLETS

Heino T. K. Halonen, Hyvinkää , and Jukka I. Pohjonen, Helsinki, both of Finland, assignors to Elevator GmbH, Baar, Switzerland

Filed May 24, 1985, Ser. No. 738,761
Claims priority, application Finland, May 24, 1984, 842089
Int. Cl.[4] B65G *1/06*
U.S. Cl. 414—286 **3 Claims**



1. In an apparatus for lateral transfer of roller pallets from first storage shelving to second storage shelving, the apparatus including rails associated with the first and second shelving, a bridge and stopper mechanism comprising:

at least one bridge associated with said rails, each said bridge constituting a rail extension and being mounted on an end body portion of the apparatus and being pivotable between said shelving and said body portion of the apparatus,

movable stop means, associated with each said bridge, for selectively controlling access of the roller pallets on the first shelving to the body of the apparatus,

said controlling means including

(a) at least one actuator lever having a first end pivotally supported by the body of the apparatus adjacent each said rail, said lever being parallel to and coextensive with said bridge and a second free end,

(b) means for reversibly pivoting each said actuator lever and its associated bridge, with respect to the body of the apparatus, between a first position in which said each actuator lever and its associated bridge assumes a substantially horizontal disposition so that desired number of roller pallets can transfer from the first storage shelving to the body of the apparatus, and a second position in which each said actuator lever and its associated bridge assumes a substantially vertical disposition so that the transfer of said desired number of pallets can stop, and

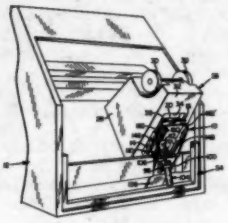
means for reversibly rotating said actuator lever to a third position below said first position for releasing said stop controlling means to provide access for roller pallets on said first storage shelving to the body of the apparatus.

4,673,327

WASTE RECEPTACLE DUMPING APPARATUS

Johnn P. Knapp, Portland, Oreg., assignor to Lear Siegler, Inc., Tualatin, Oreg.

Filed Oct. 9, 1985, Ser. No. 786,323
Int. Cl.[4] B65D *3/02*
U.S. Cl. 414—408 **6 Claims**



1. An apparatus for inverting a receptacle to dump its contents into a refuse collector, wherein the receptacle has two spaced-apart handle elements, the apparatus comprising:

a mounting support securable to the refuse collector;

a tipper plate pivotally mounted to the mounting support for movement about a first pivot axis, the tipper plate having a first hooking member fastened thereto for engaging one of the handle elements of the receptacle;

a lock plate mounted to the tipper plate for sliding movement relative thereto, the lock plate having a second hooking member fastened thereto for engaging the other handle element of the receptacle;

a drag link having one end pivotally connected to the mounting support to define a second pivot axis that is offset from the first pivot axis, the drag link having another end that is pivotally connected to the lock plate;

drive means pivotally mounted to the mounting support about a third pivot axis and pivotally connected to the tipper plate about a fourth pivot axis, the drive means configured for moving the tipper plate about the first pivot axis between a rest position and a dump position through an intermediate receptacle-locking position, wherein the receptacle is substantially upright when in the rest position and is substantially inverted when in the dump position, and wherein the first and second hooking elements move apart and engage their associated handle elements when the receptacle is moved between the rest position and the dump position.

4,673,328

LIFT/TILT-BED TRAILER

J. Michael Shiels, 132 W. Houghton, Santa Fe, N. Mex. 87501

Filed Jun. 10, 1985, Ser. No. 743,313
Int. Cl.[4] B60P *1/02*
U.S. Cl. 414—471 **10 Claims**

1. A lift/tilt-bed trailer which comprises in combination:

a. a first substantially rigid elongated frame member having a first end and a second end;

b. a second substantially rigid elongated frame member rigidly attached to said first frame member substantially perpendiuclar thereto at the first end thereof;

c. a third substantially rigid elongated frame member rigidly attached to said first frame member in a direction substantially perpendicular thereto at the second end thereof and disposed in substantially the same direction as said second frame member, said third frame member being substantially parallel thereto, whereby a substantially planer, three-sided rectanguler "U"-frame is formed;

d. a first wheel;

e. a second wheel;

f. means for rotatably attaching said first wheel to said second frame member such that said first wheel is located on the side of said second frame member away from said third frame member;

g. means for rotatably attaching said second wheel to said third frame member in an opposing manner to said first wheel;

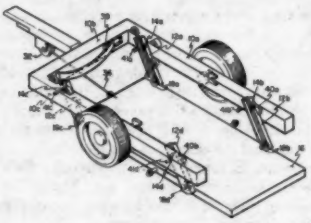
h. a substantially planar rectangular bed adapted to fit substantially within said rectangular "U"-frame;

i. bed positioning means for raising and lowering said substantially planer rectangular bed relative to said rectangular "U"-frame, said bed positioning means including:

1. a first track member pivotably attached to said second frame member on the side thereof facing said third frame member;

2. a second track member pivotably attached to said third frame member disposed in an opposing manner to said first track member;

3. a third track member pivotably attached to said second frame member on the side thereof facing said third member and at a position thereon further away from said first frame member than said first track member;



4. a fourth track member pivotably attached to said third frame member disposed in an opposing manner to said third track member;

5. first bed translating means adapted to move within said first track member and be guided thereby, said first bed translating means being fixed to the outside edge of said bed in the vicinity of said first track member facing said first track member;

6. second bed translating means adapted to move within said second track member and be guided thereby, said second bed translating means being fixed to the outside edge of said bed in the vicinity of said second track member facing said second track member;

7. third bed translating means adapted to move within said third track member and be guided thereby, said third bed translating means being fixed to the outside edge of said bed in the vicinity of said third track member facing said third track member; and

8. fourth bed translating means adapted to move within said fourth track member and be guided thereby, said fourth bed translating means being fixed to the outside edge of said bed in the vicinity of said fourth track member facing said fourth member; and

j. means for imparting motion to said bed relative to said rectangular "U"-frame, whereby as said bed is moved toward said first frame member said bed is guided by said track members and said bed translating means to a position approximately level with said rectangular "U"-frame and approximately parallel thereto, said track members assuming a position substantially parallel to said rectangular "U"-frame, and whereby as said bed is moved away from said first frame member said bed is similarly guided to a position such that it is at rest on the surface upon which said first wheel and said second wheel are resting while said rectangular "U"-frame remains approximately parallel thereto, each of said track members having the end thereof away from said first frame member touching the surface and forming an angle with said rectangular "U"-frame as a result of having pivoted about said pivotable attachment therof.

4,673,329

ARM DEVICE FOR INDUSTRIAL ROBOT

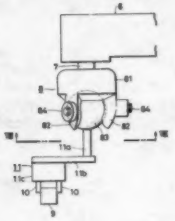
Hisao Kato, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 5, 1985, Ser. No. 720,222

Claims priority, application Japan, Apr. 6, 1984, 59-67405; Oct. 11, 1984, 59-213133

Int. Cl.[4] B25J *19/06*

U.S. Cl. 414—744 A **9 Claims**



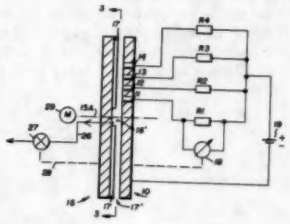
1. An arm device for an industrial robot, comprising: an arm; means for moving said arm in an instructed direction; an operating mechanism coupled to a part of said arm for carrying out an instructed operation; and an evading mechanism disposed between said arm and said operating mechanism for allowing said operating mechanism to perform relative movement with respect to said arm when an extraordinary external force is exerted on said operating mechanism so as to permit said operating mechanism to perform an evading motion; the improvement wherein said evading mechanism comprises:

(a) a housing coupled to and fixed to said arm;

(b) a movable member rotatably mounted in said housing so as to be rotatable in horizontal and vertical directions; and

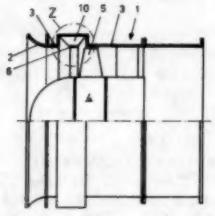
(c) at least one coupling mechanism for applying a coupling force between said housing and said movable member so as to inhibit relative movement between said housing and said movable member during normal operation but to allow said relative movement between said housing and said movable member upon occurrence of said extraordinary external force, wherein said housing comprises a plurality of circumferentially spaced projecting parts extending away from said arm, said projecting parts defining therebetween circumferentially spaced openings, said movable member being mounted in said housing so as to be rotatable in horizontal and vertical directions, said arm device further comprising a coupling shaft joining said evading mechanism and said operating mechanism, said coupling shaft having a diameter less than a width of one of said openings between said projecting parts, and wherein said at least one coupling mechanism comprises a plurality of coupling members, each coupling member being disposed in a respective one of said projecting parts, and said projecting parts being located laterally of said movable member, whereby said coupling members apply coupling forces laterally of said movable member in plural directions.

4,673,330
METHOD FOR CONTROL OF THE FUNCTION OF A CENTRIFUGAL PUMP
Bertil Granberg, Karlstad, Sweden, assignor to Kamyr AB, Karlstad, Sweden
Filed Sep. 18, 1985, Ser. No. 777,302
Claims priority, application Sweden, Sep. 21, 1984, 8404734
Int. Cl.[4] F01D 5/18; B01D 19/00
U.S. Cl. 415—1 15 Claims



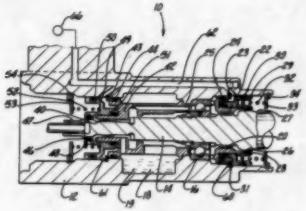
1. A method of controlling the operation of a centrifugal pump in which gas has a tendency to collect in a bubble, when pumping a liquid or suspension which contains gas, comprising the steps of:
(a) sensing the size of the gas bubble by taking advantage of the difference in electrical conductivity between the gas in the bubble and the liquid or suspension being pumped; and
(b) discharging gas from the pump so as to regulate the size of the bubble.

4,673,331
AXIAL BLOWER
Werner Kolb, Zweibrücken, Fed. Rep. of Germany, assignor to Turbo-Luft-Technik GmbH, Zweibrücken, Fed. Rep. of Germany
Filed Feb. 3, 1986, Ser. No. 825,205
Claims priority, application Fed. Rep. of Germany, Nov. 8, 1985, 3539604
Int. Cl.[4] F04D 29/54
U.S. Cl. 415—53 R 4 Claims



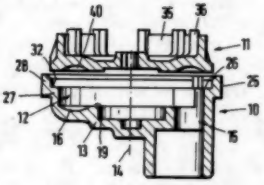
1. Axial blower comprising: a casing with an axis including a cylindrical portion and an inlet portion, said inlet portion tapering conically into said cylindrical portion; an impeller rotating inside said cylindrical portion; a stationary ring of substantially the same diameter as said cylindrical portion positioned upstream of said impeller; an annular channel surrounding said stationary ring and having ends; said stationary ring being equidistant from each end of said annular channel; and guide vanes with upstream and downstream edges, said guide vanes being positioned inside said annular channel and fixed to said stationary ring and said casing of the blower, said guide vanes comprising flat sheets of metal, said upstream and downstream edges sloping out from said stationary ring to said casing, said guide vanes being positioned parallel to the axis of said casing and at an angle to a radius of said casing.

4,673,332
LUBRICATION SEALS
Raymond Smith, Monclova, Ohio, assignor to Teledyne Industries, Inc., Los Angeles, Calif.
Filed Jul. 25, 1984, Ser. No. 634,213
Int. Cl.[4] F04D 29/10
U.S. Cl. 415—113 18 Claims



1. A seal for continuously maintaining a fluid seal between a housing and a shaft rotatably mounted in said housing, rotation of said shaft defining a longitudinal rotational axis thereof, said seal comprising a higher rotational speed seal and a lower rotational speed seal each disposed between said housing and said shaft, wherein one of said higher and lower speed seals is positioned axially stationary with respect to said shaft, and the other of said lower and higher speed seals is mobile with respect to said shaft between a first position in sealing contact with said shaft and said housing, and a second position out of sealing contact with at least one of said shaft and said housing, such that an effective fluid seal is continuously maintained between said shaft and said housing independently of the speed of rotation of said shaft.

4,673,333
FUEL SUPPLY PUMP
Hermann Kluge, Ingersheim, Fed. Rep. of Germany, assignor to SWF Auto-Electric GmbH, Bissingen, Fed. Rep. of Germany
Filed Jun. 26, 1985, Ser. No. 749,315
Claims priority, application Fed. Rep. of Germany, Jul. 4, 1984, 3424520
Int. Cl.[4] F04D 5/00
U.S. Cl. 415—213 T 17 Claims

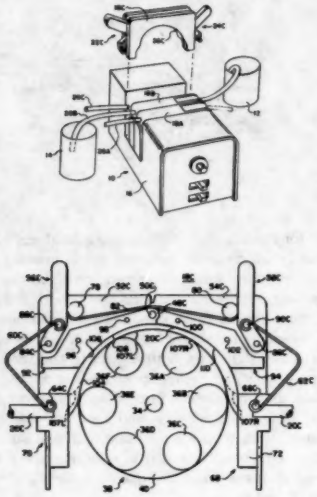


1. A fuel supply pump for volatiling fuel, comprising an inlet opening (15) to a pump chamber (12), an impeller (60) in the pump chamber (12) and a side channel (40) on whose end an outlet opening (41) is provided, said outlet opening (41) being separated from the entry (44) of the side channel (40) by a sealing surface (45) with a vent hole (47), wherein the outlet opening (41) has two areas, including a broader area (42) and a narrower area (43) extending across a finite angle and being adjacent to each other in the circumferential direction, said areas having radially differing widths, and with the narrower area (43) extending externally farther into the sealing surface (45) than internally.

4,673,334
PERISTALTIC PUMP

Robert W. Allington, and John D. Hull, both of Lincoln, Nebr., assignors to Isco, Inc., Lincoln, Nebr.

Continuation of Ser. No. 614,331, May 25, 1984, abandoned. This application Feb. 3, 1986, Ser. No. 825,690
Int. Cl.[4] F04B *43/12*
U.S. Cl. 417—53 25 Claims



1. A method of pumping comprising the steps of:
orbiting a plurality of rollers about a drive shaft in a circular orbit;
positioning each of a plurality of flexible tubes in a corresponding one of a plurality of tube supports against a corresponding cam surface wherein each of the tube supports has mounted to it a corresponding guide surface spaced a programmed distance from the cam surface;
resiliently mounting at least some of said guide surfaces against said rollers independently from the other guide surfaces wherein said tubes are compressed to a programmed degree along their lengths and said at least some of said guide surfaces are movable with respect to other of said guide surfaces during pumping.

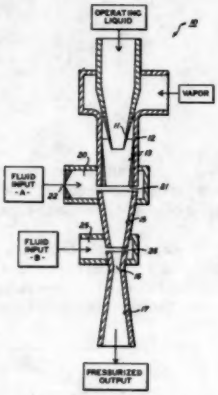
4,673,335
GAS COMPRESSION WITH HYDROKINETIC AMPLIFIER

Carl D. Nicodemus, Caledonia, N.Y., assignor to Helios Research Corp., Mumford, N.Y.

Continuation-in-part of Ser. No. 612,742, May 21, 1984, Pat. No. 4,569,635. This application May 3, 1985, Ser. No. 730,087
Int. Cl.[4] F04F *5/00*
U.S. Cl. 417—54 23 Claims

1. A method of entraining gas in a liquid jet for compressing the entrained gas, said method comprising:
a. forming said liquid jet within a hydrokinetic amplifier by feeding a portion of the pressurized liquid output from said hydrokinetic amplifier back to a liquid input to said hydrokinetic amplifier to give said jet a high initial velocity that is accelerated within said hydrokinetic amplifier by a motivating vapor surrounding and condensing in said jet;
b. via an inlet to said hydrokinetic amplifier, admitting uncompressed gas to the accelerating liquid jet within proximity to a minimum cross-sectional flow area of said hydrokinetic amplifier so that said gas merges with said jet and becomes compressed in said pressurized liquid output; and
c. separating compressed gas from said pressurized liquid output in a pressurized separation reservoir supplied with said pressurized liquid output and supplying pressurized liquid for input to said hydrokinetic amplifier.

18. A gas compressor using a jet for entraining and compressing gas, said compressor comprising:
a. a hydrokinetic amplifier arranged for creating said jet with feedback means for deriving liquid for said jet from a pressurized liquid output of said hydrokinetic amplifier, said pressurized liquid output being input to said hydrokinetic amplifier to give said jet a high initial velocity that is accelerated through said hydrokinetic amplifier by a motivating vapor surrounding and condensing in said jet;



b. an inlet to said hydrokinetic amplifier for admitting uncompressed gas to merge with said jet within proximity to a minimum cross-sectional flow area of said hydrokinetic amplifier so that said gas is compressed in said pressurized liquid output downstream of said minimum cross-sectional flow area; and
c. a pressurized separation reservoir receiving from said hydrokinetic amplifier said pressurized liquid output containing compressed gas and supplying pressurized liquid for said feedback means.

4,673,336
DIAPHRAGM GAS PUMP

James D. Moore, 1823 Border Ave., Torrance, Calif. 90501

Filed Apr. 3, 1986, Ser. No. 847,478
Int. Cl.[4] F04B *19/00, 37/00, 43/00, 45/00*
U.S. Cl. 417—239 18 Claims

1. An oil free diaphram gas pump for providing compressed gas comprising:
a pressure tank having an outlet; and
a concave pressure bulkhead connected to one end of said pressure tank and having a hole in its center communicating to the interior of said pressure tank and having a vent communicating to the ambient atmosphere; and
a first circular flange mounted on said pressure bulkhead and having a bevel on its inner edge; and
a round rigid diaphram mounted on said first circular flange thereby forming a flow pressure bulkhead volume between said pressure bulkhead and said rigid diaphram and wherein said round rigid diaphram has an undulated circumferential periphery, which at the edge of said periphery matches said bevel on said first circular flange and is

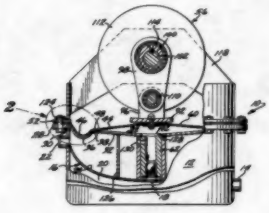
flush with said bevel when said rigid diaphram is mounted on said first circular flange and wherein said rigid diaphram has a hole in its center concentric with said hole in said pressure bulkhead; and

a round flexible diaphram mounted on said round rigid diaphram and wherein said round flexible diaphram has an undulated circumferential periphery which matches said undulated periphery on said round rigid diaphram; and

a second circular flange fastened to said first circular flange making contact with the edge of said flexible diaphram thereby providing a means for pressing said flexible diaphram and said rigid diaphram together between said first and said second circular flanges; and

a continuous diaphram gasket mounted between said undulated periphery of said flexible diaphram and said undulated periphery of said rigid diaphram; and

a prime mover coupled to the center of said flexible diaphram for the purpose of moving a portion of said flexible diaphram from a position away from said rigid diaphram



to a position in close proximity to said rigid diaphram wherein said portion of said flexible disphram extends from said interior circular boundary to said center of said flexible diaphram; and

a cylindrical compressor cartridge means mounted between said hole in center of said rigid diaphram and said hole in center of said pressure bulkhead for providing a first switching means for controlling the opening and closing of a communication path between interior of said pressure tank and the volume between said rigid diaphram and said flexible diaphram and a second switching means for controlling the opening and closing of a communication path between said low pressure bulkhead volume and said volume between said rigid diaphram and said flexible diaphram wherein said first switching means closes and said second switching means opens when said prime mover moves said flexible diaphram away from said rigid diaphram and said first switching means opens and said second switching means closes when said prime mover moves said flexible diaphram toward said rigid diaphram.

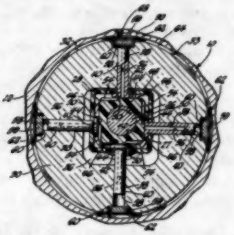
4,673,337

HYDRAULIC RADIAL PISTON PUMP INTAKE PORTING ARRANGEMENT

Gary T. Miller, Amherst, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 27, 1985, Ser. No. 802,587
Int. Cl.[4] F01B *13/06*; F04B *1/04*
U.S. Cl. 417—273 **3 Claims**

1. A hydraulic radial piston pump having a slider block mounted on an eccentric of a rotary shaft in a hydraulic fluid supplied cavity, a piston mounted in a cylinder disposed radially to the shaft, the piston having a flat working face at one end operating in the cylinder and a flat pad at an opposite end slidably engaged by a flat face of the slider block so as to force the piston outward on a compression stroke on shaft rotation, a yoke retaining the piston to the slider block so as to retract the piston inward on an intake stroke on shaft rotation characterized by intake porting means for communicating the cavity with the working end of the piston comprising an intake passage extending centrally and axially through the piston from the working end to the pad end resulting in an annular face at both piston ends, an elongated intake slot in the face of the slider block extending from a point continuously open to the cavity to a point that opens to the intake passage at the pad end on relative movement of the slider block during the intake



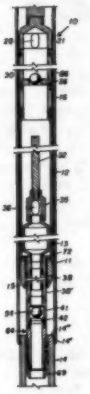
stroke to just prior to the compression stroke, and the annular faces at the working and pad ends of the piston having substantially equal areas to prevent hydraulic film from developing between the slider block and pad and thereby prevent their separation during compression.

4,673,338

TRAVELLING BARREL DOWN HOLE PUMP HAVING A GAS RELIEF PROBE

William A. Jones, P.O. Box 621, Lotus, Calif. 95651

Continuation-in-part of Ser. No. 688,029, Dec. 31, 1984, abandoned. This application Apr. 10, 1986, Ser. No. 850,139
Int. Cl.[4] F04B *21/04*
U.S. Cl. 417—435 **9 Claims**



1. An improved down hole pump comprising:

a. a fixed lower standing first valve having an opening leading into a first open end thereof;

b. a first valve seat in said valve, having an opening normally closed by a

c. valve element freely movable in said valve and of a diameter sufficient to close off the opening of said valve seat, said valve having a second open end with a reduced neck opening of a diameter less than the diameter of said valve element,

said seat being disposed between said first and second open ends;

d. a tubing, fixed to said valve and extending upwardly

therefrom, and in fluid communication with the interior of said valve, said tubing also being fixed to

e. a midwardly disposed cage;

f. a travelling barrel encircling said tubing, and said midwardly disposed cage and movable with respect to said tubing and cage;

g. a gas relief, valve lifting, probe means in the form of an enlarged rod mounted within said barrel, said probe means being free at its upper end for travel, said probe means at its opposite end being fixed to he upper end of the midwardly disposed cage and extending upwardly therefrom,

said gas relief, valve lifting, probe having at its lower end openings in fluid communication with the interior of the travelling barrel,

said probe, having a minimal finite length determined by the operational parameters of the well in which the down hole pump is to be utilized, and said probe also terminating at its uppermost point with a concave radius;

said travelling barrel having its lower end provided with a

h. guide bushing, said guide bushing having an inside diameter greater than the outside diameter of the aforementioned tubing, and encircling said tubing and movable with respect thereto,

said guide bushing also having an inside diameter less than that of the aforementioned midwardly disposed cage, while said midwardly disposed cage has a greater outside diameter than said guide bushing, which is necessary, in order to pull the pump as a complete assembly;

and the aforementioned travelling barrel's upper end being coupled to

i. a variable length upper spacing sleeve, preferably via an interposed adapter, the said spacing sleeve being in fluid communication with the interior of said travelling barrel, the upper barrel spacing sleeve being sized in length slightly greater than the length of said gas relief probe,

said upper surface sleeve having a seat retaining base normally disposed at any location from the bottom thereof to a point along the elevation thereof, distant from said upper cage,

j. a second valve seat having an opening in fluid communication with said upper spacing sleeve, and being provided with a valve seat retaining shoulder;

k. a second valve element freely movable in said upper spacing sleeve and having a diameter sufficient to close off the opening in said second valve seat,

l. an upper cage in fluid communication with said upper spacing sleeve, and being provided with openings less than the diameter of said second valve element, the upper cage adapted for fluid communication with the well production tubing,

said upper cage being sealed at its upper interior and being adapted for connection to a sucker rod string of a well riser;

whereby after the pump is seated in the down stroke position,

as the first half of the cycle, the travelling barrel rises on the up stroke thus allowing the first valve element to unseat, such that fluid enters through the first open end through the narrow open first valve, through the open tubing through the hollow piston out the openings at the lower end of the valve lifting probe into the travelling barrel above the piston; and

on the second half of the cycle, the down stroke, the travelling barrel descends compressing the fluid between the first valve and the second valve, such that

at the point when the compression differential between the valves is insufficient to unseat the upper travelling valve, due to the presence of gases the valve lifting probe passes into the upper barrel spacing sleeve, through the opening of the valve seat, connecting the valve element and thus lifting said element off its seat upwardly into the confines of the upper spacing chamber to a height short of pushing the valve element into the top of upper cage and causing pump damage thereby permitting the trapped gases to escape a quantum at a time of each pump cycle.

4,673,339

SCROLL COMPRESSOR WITH SUCTION PORT IN STATIONARY END PLATE

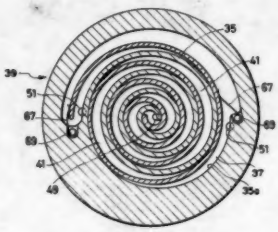
Makoto Hayano; Shigemi Nagatomo, both of Tokyo; Hirotsugu Sakata, Chigasaki; Mitsuo Hatori, Yokohama, and Hitoshi Hattori, Yokosuka, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 725,334, Apr. 19, 1985, abandoned. This application Aug. 14, 1986, Ser. No. 896,347

Claims priority, application Japan, Jul. 20, 1984, 59-150817

Int. Cl.[4] F04C *18/04*

U.S. Cl. 418—15 **11 Claims**



1. A scroll compressor comprising:

a sealed vessel;

a frame disposed inside said sealed vessel to rotatably support a rotating shaft and to partition the interior of said sealed vessel into a drive chamber and a compression device chamber, said rotating shaft being disposed within said drive chamber;

a stationary end plate which has an outer wall and a first scroll wrap radially inward of said outer wall and which is tightly fixed to said frame inside the sealed vessel;

an orbiting end plate engaged with said rotating shaft on a first surface thereof and movable thereby, said orbiting end plate having on a second surface opposite said first surface a second scroll wrap slidable against said first scroll wrap at a plurality of places to form a plurality of compression chambers; said compression chambers being centripetally rotated in correspondence with the movement of said orbiting end plate, said stationary end plate formed with at least one suction port opened at an outer peripheral portion of said stationary end plate so as to communicate with a suction chamber, and a discharge port substantially in the center of said stationary end plate to exhaust the compressed gas into said compression device chamber, said suction port being opened and closed by said movable second scroll wrap;

wherein said suction chamber is defined by said first and second scroll wraps, said stationary end plate and a baffle means attached at one end to said stationary end plate and at the other end slidingly contacts said second scroll wrap.

4,673,340

VARIABLE CAPACITY SCROLL TYPE FLUID COMPRESSOR

Atsushi Mabe, Isesaki, and Masami Negishi, Takasaki, both of Japan, assignors to Sanden Corporation, Gunma, Japan

Continuation of Ser. No. 690,201, Jan. 10, 1985, abandoned. This application May 22, 1986, Ser. No. 865,594

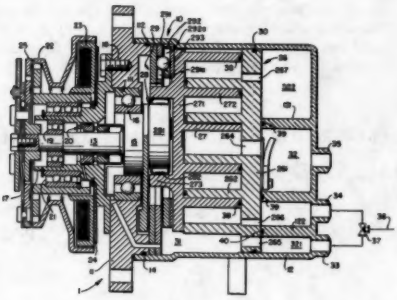
Int. Cl.[4] F04C *18/04, 29/08*

U.S. Cl. 418—15 **9 Claims**

1. In a scroll type fluid compressor including a pair of scrolls each having a circular end plate and a wrap extending from

one end surface of said circular end plate, said wraps interfitting at angular and radial offset to make a plurality of line contacts to define at least one pair of sealed off fluid pockets, a driving mechanism operatively connected to one of said scrolls to effect the orbital motion of said one scroll and rotation preventing means for preventing the rotation of said one scroll during orbital motion to thereby change the volume of the fluid pockets, the improvement comprising:

a suction hole formed through said circular end plate of a selected scroll of said pair of scrolls to form a first fluid communication channel between said fluid pockets and a first fluid inlet port;



first and second holes formed through said circular end plate of said selected scroll to form a second fluid communication channel between said fluid pockets and a second fluid inlet port, said second fluid communication channel being formed when the volume of said fluid pockets is less than the volume of said fluid pockets when said first fluid communication channel is formed; and

valve means for changing the displacement capacity of said compressor by selectively controlling the opening and closing of said first and second fluid inlet ports.

4,673,341

VARIABLE CAPACITY ROLLER- AND VANE-TYPE PUMPS WITH NON-CIRCULAR CAM PROFILE

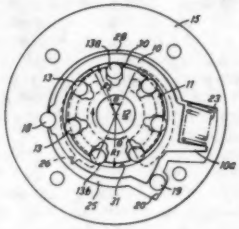
Ian T. Bristow, Higham, England, assignor to Hobourn-Eaton Limited, Kent, England

Filed Jul. 5, 1985, Ser. No. 751,975

Claims priority, application United Kingdom, Jul. 5, 1984, 8417146

Int. Cl.⁴ F04C *2/344, 15/04*

U.S. Cl. 418—26 **3 Claims**



1. A pump comprising a casing having an inlet port and an outlet port; a carrier mounted in the casing for rotation about a fixed axis; a cam ring mounted in the casing and extending about the carrier, the carrier having radially extending slots evenly spaced along its periphery; and piston elements disposed in the slots for radial movement in sealing engagement with a radially inner cylindrical cam surface of the cam ring whereby chambers are formed between adjacent ones of the piston elements which increase and decrease in volume as the carrier rotates about said axis, to pump fluid from the inlet port to the outlet port of the pump, two of the piston elements at any instant constituting sealing elements between adjacent ends of the the inlet and outlet ports; the cam ring being mounted for guided movement in a direction substantially radially of the carrier between first and second predetermined positions thereby to vary the change in volume of the chambers in their pumping cycle and hence the delivery of the pump, between a predetermined maximum and a predetermined minimum change, respectfully; said cam surface being arcuate but not completely circular in profile, the cam profile in two angular extents thereof between the circumferential ends of the inlet and outlet ports being such that when the cam ring is in a predetermined position of adjustment relative to the carrier, which predetermined position is intermediate said first and second positions, then as each of the two piston elements constituting sealing elements moves through the angular distance between the circumferential ends of the inlet and outlet ports, the instantaneous distance R_2 of the point of contact of one of said sealing elements with the cam profile from the axis of rotation of the carrier is constant and is given by $R_2=\sqrt{R_1^2+k}$ where k is a constant which may be positive or negative but which is not zero, and R_1 is the instantaneous distance of the point of contact of the other of said sealing elements with the cam profile from the axis of rotation of the carrier and is constant.

4,673,342

ROTARY PUMP DEVICE HAVING AN INNER ROTOR WITH AN EPITROCHOIDAL ENVELOPE TOOTH PROFILE

Yasuyoshi Saegusa, Itami, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

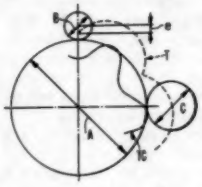
Continuation-in-part of Ser. No. 545,193, Oct. 25, 1983. This application May 8, 1985, Ser. No. 760,822

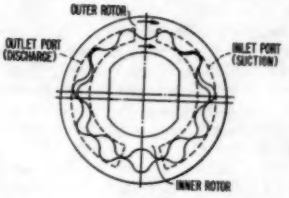
Claims priority, application Japan, Oct. 27, 1982, 57-189880

The portion of the term of this patent subsequent to Apr. 14, 2004, has been disclaimed.

Int. Cl.⁴ F04C *2/10;* **F16H** *55/08*

U.S. Cl. 418—150 **9 Claims**





1. An inner gear rotor for eccentric rotation in an outer gear rotor of a rotary gear pump, comprising an inner rotor member having a center axis and an outer peripheral profile surface whose cross section perpendicular to said center axis is in the

form of an inner envelope curve derived by moving a locus circle of diameter C with its center on an epitrochoidal curve, said epitrochoidal curve having dimensions defined by a base circle of diameter A, a rolling circle of diameter B and an eccentricity of length e, whereby said member has an eccentricity ratio $f_e=e/B$, a locus circle ratio $f_c=C/B$ and a base circle ratio $n=A/B$, said ratios f_e, f_c and n defining a quantity $K_i=(n+1)\times|1-2f_e|$; said ratios having values such that $f_c/K_i \leqq 1.1$.

4,673,343

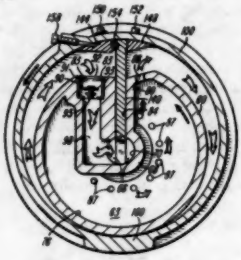
ROTARY VANE PUMP

Jesse C. Moore, 309 S. Portland St., Celina, Ohio 45822

Continuation-in-part of Ser. No. 600,281, Apr. 13, 1984, Pat. No. 4,568,257. This application Jan. 27, 1986, Ser. No. 822,374

Int. Cl.[4] F04C *2/46, 18/46*

U.S. Cl. 418—173 **12 Claims**



1. A fluid pump comprising:

support means,

an inner rotor, the inner rotor having a peripheral surface, the inner rotor also having a cavity there-within and being substantially hollow,

shaft means attached to the inner rotor for rotation therewith, the shaft means rotatably supporting the inner rotor upon the support means, the shaft means including fluid conduit means,

an outer rotor encompassing the inner rotor, the outer rotor being substantially hollow and having an inside dimension considerably larger than the outside dimension of the inner rotor, wherein a chamber is formed between the outer rotor and the inner rotor, bearing means rotatably supporting the outer rotor upon the shaft means for rotation of the outer rotor about an axis spaced from the axis of rotation of the inner rotor,

the inner rotor having an exterior portion, the outer rotor having an exterior portion,

fluid port means within the outer rotor and fluid port means within the inner rotor and positioned adjacent the shaft means, the fluid port means providing fluid communication between the exterior portion of the outer rotor and the cavity within the inner rotor for fluid flow from the exterior portion of the outer rotor to the cavity within the inner rotor,

means forming a first passage within the inner rotor, the first passage extending from the cavity of the inner rotor to the exterior portion of the inner rotor for flow of fluid from the cavity of the inner rotor to the chamber between the outer rotor and the inner rotor, conduit means forming a second passage which extends within the inner rotor, the second passage extending between the exterior portion of the inner rotor and the fluid conduit means of the shaft means for flow of fluid from the chamber between the rotors to the fluid conduit means of the shaft means,

wall means forming an axially and radially extending slot in the inner rotor, the wall means and the slot extending radially substantially between the periphery of the inner rotor and the axis of rotation thereof, the wall means and the slot extending substantially the axial length of the inner rotor,

an axially extending vane within the outer rotor and secured thereto for movement therewith, the vane being positioned within the slot of the inner rotor, the vane extending substantially the axial length of the slot, the vane having a portion movable to and from a position adjacent the axis of rotation of the inner rotor,

wherein fluid flows into the cavity of the inner rotor through the fluid port means of the rotors and fluid flows from the cavity through the first passage and into the chamber between the rotors, and wherein the inner rotor and the outer rotor rotate together about eccentric axes and force fluid from the chamber into the conduit means and through the second passage of the inner rotor into the fluid conduit means of the shaft means for flow of fluid from the fluid pump through the shaft means.

4,673,344

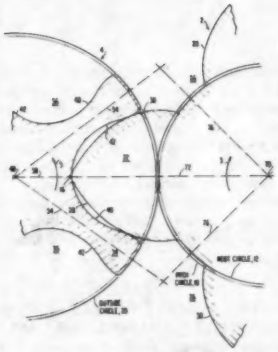
SCREW ROTOR MACHINE WITH SPECIFIC LOBE PROFILES

Robert A. Ingalls, 349 Highland Rd., Springfield, Vt. 05156

Filed Dec. 16, 1985, Ser. No. 808,988

Int. Cl.[4] F04C *18/16*

U.S. Cl. 418—201 **10 Claims**



1. An elongated female rotor for a screw rotor machine having an intake side and a discharge side; a male rotor, and a housing including housing bores for said female rotor and said male rotor; said elongated female rotor being rotatable about a central axis and having a pitch circle centered on said axis, having an outer diameter and comprising;

a plurality of elongated helical lobes extending longitudinally of said rotor and circumferentially spaced about said pitch circle so as to provide intervening grooves therebetween forming addendum portions outside the pitch circle and dedendum portions inside the pitch circle; said elongated female rotor being rotatable about a central axis, having a pitch circle centered on said axis and having an outer diameter;

a major portion of each of said lobes extending radially inwardly of said pitch circle;

the profile of each of said lobes in a plane perpendicular to said axis having a tip portion and respective generally concave leading and trailing flank portions extending intermediate said tip portion and a root portion of the respective adjacent groove;

and wherein said lobes of said female rotor engage grooves of said male rotor defined by corresponding helical male rotor lobes with contact between flank portions of respective female and male rotors during rotation of one rotor relative to the other;

the improvement wherein the profile of the leading flank

portion of each female rotor lobe is defined by first and second circular arc portions subscribed by first and second radii within the addendum and dedendum portions of said lobe, respectively, providing a smooth uninterrupted surface, starting below the pitch circle and terminating at the outside circle of the rotor with the point of tangency of the arcs formed by the first and second radii occurring at a point of zero sliding with the male rotor on said pitch circle;

whereby, said female leading flank surface portions facilitate male drive of the female rotor and reduction in blowholes formed between the female and male screw rotor leading flanks on the intake side of the screw rotor machine.

4,673,345

ARRANGEMENT FOR THE MANUFACTURE OF AN ELONGATED ORGAN

Kurt G. Andersson, Grevgatan 62, 114 59 Stockholm, Sweden

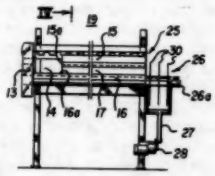
PCT No. PCT/SE84/00303, § 371 Date May 16, 1985, § 102(e) Date May 16, 1985, PCT Pub. No. WO85/01243, PCT Pub. Date Mar. 28, 1985

PCT Filed Sep. 18, 1984, Ser. No. 734,968

Claims priority, application Sweden, Sep. 21, 1983, 8305106; Mar. 20, 1984, 8401526

Int. Cl.⁴ B29C *35/08*

U.S. Cl. 425—174.8 R **4 Claims**



1. Apparatus for the manufacture of an elongated organ, said apparatus comprising:

(a) a material hopper which, in use, is filled with a fibrous material moistened with a bonding agent, said material hopper having an outlet;

(b) a material charging chamber in communication with the outlet of said material hopper;

(c) a first elongated compression chamber located adjacent to said material charging chamber, said first elongated compression chamber having a movable side wall;

(d) a first fluid cylinder having a rod connected to said movable side wall of said first elongated compression chamber, said first fluid cylinder being adapted to move said movable side wall of said first elongated compression chamber through said material charging chamber, forcing a charge of the fibrous material into said first elongated compression chamber and partially compressing the fibrous material therein;

(e) a second elongated compression chamber located adjacent to said first elongated compression chamber, two opposing side walls of said second elongated compression chamber being formed of an insulating material;

(f) a second fluid cylinder having a rod disposed at a right angle to the rod of said first fluid cylinder, the rod of said second fluid cylinder being connected to a long rod formed of insulating material, said second fluid cylinder being adapted to move said long rod through said first elongated compression chamber, forcing a partially compressed charge of fibrous material from said first elongated compression chamber into said second elongated compression chamber;

(g) a high frequency heating apparatus disposed adjacent to said second elongated compression chamber in position to heat the compressed fibrous material in said second elongated compression chamber, two opposing side walls of said second elongated compression chamber being formed of an electrically conductive material and being disposed between the two previously mentioned side walls of said second elongated compression chamber comprising components of said high frequency heating apparatus;

(h) a third fluid cylinder having a rod disposed in parallel to the rod of said second fluid cylinder, the rod of said third fluid cylinder being connected to at least one of the walls of said second elongated compression chamber, said third fluid cylinder being adapted to move said at least one of the walls of said second elongated compression chamber in the opposite direction to the movement of the compressed fibrous material as the compressed fibrous material moves through said second elongated compression chamber; and

(i) means for cutting the compressed elongated material into preselected lengths as it is forced out of said second elongated compression chamber by said second fluid cylinder.

4,673,346

CAULKING FORMING TOOL

John Anderson, 1018 Leisure Ave., Tampa, Fla. 33613

Filed Oct. 31, 1985, Ser. No. 793,741

Int. Cl.⁴ B29C *59/00*

U.S. Cl. 425—458 **6 Claims**

1. A caulking forming tool, comprising in combination:

a generally U-shaped handle member having an elongated length and composed of thin material, said handle member including elongated upstanding side walls of a certain width interconnected by an elongated bottom wall;

a plurality of uniformly thin planar elongated caulking blades of uniform design, each said caulking blade having an elongated length substantially equal to said length of said U-shaped handle member, one said caulking blade having a width substantially equal to the width of said side walls and the other said caulking blades each having a width progressively narrower than the first caulking blade; and

means for pivotably connecting said caulking blades within said handle member with said width of said caulking blades being parallel with said width of said side walls of said handle member

whereby said caulking blades may be individually selected and pivoted from said retracted position within the handle member to an extended position for use.

4,673,347

MULTIPLE STATION, MULTIPLE CLAMP ASSEMBLY BLOW MOLDING MACHINES

William E. Ziegler, 2570 Coachlite Dr., Tecumseh, Mich. 49286

Filed Aug. 21, 1984, Ser. No. 642,998

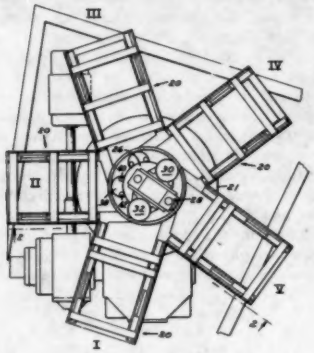
The portion of the term of this patent subsequent to May 20, 2003, has been disclaimed.

Int. Cl.⁴ B29C *49/38*

U.S. Cl. 425—538 **15 Claims**

1. In a multiple station, multiple clamp assembly blow molding machine, the improvement comprising dual opposed moveable mold platens in each clamp assembly, at least one toggle linkage in each clamp assembly actuatably attached to each platen, rotatable crank means in each clamp assembly in engagement with each toggle linkage for actuation thereof, engagement means on said crank means for rotatable actuation

thereof and a rotatable actuator at at least one station of said machine, said rotatable actuator engageable with said engage-



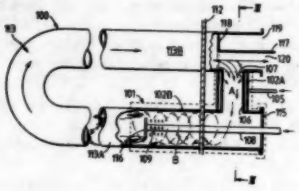
ment means for the rotation of said crank means and movement of said platens by said toggle linkages.

4,673,348

HEATING APPARATUS

Eric K. Riley, Wolverhampton; Roger Dudill, Crewe, and Philip J. Young, Whitchurch, all of England, assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Division of Ser. No. 662,852, Oct. 22, 1984, Pat. No. 4,601,655.
This application Apr. 1, 1986, Ser. No. 847,400
Claims priority, application United Kingdom, Oct. 21, 1983, 8328265; Aug. 31, 1984, 8422112
Int. Cl.[4] F23J *5/02*
U.S. Cl. 431—115 8 Claims



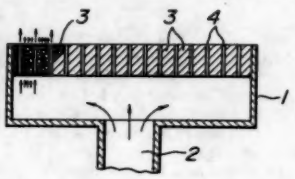
1. A heating apparatus which comprises a burner and a combustion chamber, wherein said burner comprises a first portion in which, in use, combustion gases from the or another combustion chamber are mixed with one of (a) fuel, and (b) oxygen or oxygen enriched air, a second generally tubular portion including a line which has a plurality of outlets within the confines of said second portion for introducing fuel radially into said second portion, wherein when said apparatus is in use the mixture leaving said first portion is mixed with the other of (a) said fuel, and (b) said oxygen or oxygen enriched air, wherein said combustion chamber is generally U-shaped, having first and second legs, said second portion of said burner is mounted on the first leg of said "U" in alignment therewith, and said first portion of said burner is mounted between the second leg of said "U" and said second portion of said burner; and means for igniting said mixture leaving said second portion of said burner to produce combustion gases in said first leg of said combustion chamber.

4,673,349

HIGH TEMPERATURE SURFACE COMBUSTION BURNER

Fumio Abe; Hiroshi Hasegawa; Tadashi Fujita, all of Nagoya, and Makoto Maeda, Ichinomiya, all of Japan, assignors to NGK Insulators, Ltd., Japan

Filed Dec. 16, 1985, Ser. No. 809,006
Claims priority, application Japan, Dec. 20, 1984, 59-193326[U]; Oct. 4, 1985, 60-152083[U]
Int. Cl.[4] F23D *14/12*
U.S. Cl. 431—328 5 Claims



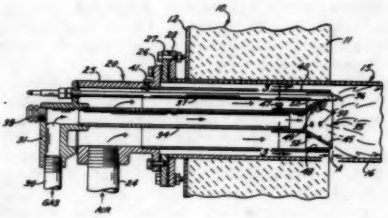
1. A high temperature surface combustion burner, comprising a burner head having an air-fuel mixed gas supply inlet, a burner plate secured to said burner head and spaced apart from said gas supply inlet, said burner plate consisting of a ceramic porous body having an inlet side and an outlet combustion side and pores being sufficiently communicated from said inlet side to said outlet side for diffusing an air-fuel mixed gas therethrough, said ceramic porous body having more than 30% by volume of pores of 25 to 500 μm in mean pore diameter; a plurality of throughholes for diffusing the air-fuel mixed gas, each throughhole having a hydraulic diameter of 0.05–5.0 mm and substantially vertically extending with respect to the outlet combustion side of the ceramic porous body and provided in said burner plate at intervals of 2 to 30 mm, whereby substantially uniform combustion occurs on the outlet combustion side of the ceramic porous body by flowing said air-fuel mixed gas through said plurality of throughholes and through said pores.

4,673,350

BURNER ASSEMBLY FOR RADIANT TUBE HEATING SYSTEM

David W. Collier, Hales Corners, Wis., assignor to Eclipse, Inc., Rockford, Ill.

Filed Aug. 26, 1986, Ser. No. 900,529
Int. Cl.[4] F23D *15/02*
U.S. Cl. 431—353 7 Claims



1. A radiant tube heating system comprising an outer radiant tube made of heat-resistant material, a burner assembly comprising an inner tube locted within and spaced inwardly from said radiant tube, said inner tube having a forward discharge end, means for delivering combustion air into said inner tube for flow toward the forward end of said inner tube, a gas supply pipe located within said inner tube and having a forward end, means for delivering gaseous fuel to said gas supply

pipe for flow toward the forward end of said gas supply pipe, a tubular nozzle on the forward end portion of said gas supply pipe and adapted to receive fuel from said supply pipe, said nozzle being at least partially disposed within said inner tube and coacting therewith to define an annular passage permitting combustion air to flow out of the forward end of said inner tube, openings in said nozzle and permitting a portion of the combustion air in said inner tube to flow into said nozzle and mix with the fuel therein, means adjacent said nozzle for igniting the fuel-air mixture discharged from said nozzle and thereby produce a flame, and means mounting said nozzle for selective back and forth adjustment relative to the forward end of said tube thereby to enable said flame to be shortened and lengthened.

4,673,351

CONTRA-ANGLE FOR DENTAL HANDPIECE

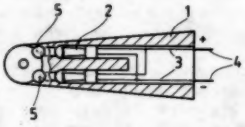
Jean-Jacques Luiset, Geneva, Switzerland, and Michel Seigneurin, Douvaine, France, assignors to Micro-Mega S.A., Besancon, France

Filed Nov. 7, 1985, Ser. No. 795,998

Claims priority, application France, Nov. 7, 1984, 84 17334; Feb. 15, 1985, 85 02692

Int. Cl.[4] A61C *1/08, 3/00*

U.S. Cl. 433—29 **8 Claims**



1. A contra-angle for a dental handpiece provided with means for illuminating the site of treatment, comprising a head, a body extending from the head, the body having means defining a recess disposed thereon adjacent to the head, at least one light source incorporated inside the body for emitting light rays, and a total reflection prism disposed in front of the light source for receiving the light rays, said total reflection prism being embedded in the recess and arranged so as to totally deflect the light rays towards the site of treatment.

4,673,352

DEVICE FOR MEASURING RELATIVE JAW POSITIONS AND MOVEMENTS

Markus Hansen, Prinz-Albert-Strasse 63, D-5300 Bonn 1, Fed. Rep. of Germany

Filed Jan. 2, 1986, Ser. No. 815,713

Claims priority, application Fed. Rep. of Germany, Jan. 10, 1985, 3500605

Int. Cl.[4] A61C *19/04*

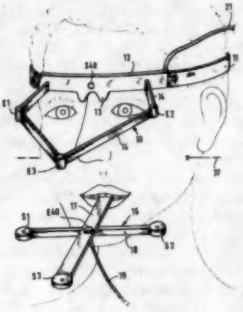
U.S. Cl. 433—69 **6 Claims**

1. Apparatus for measuring the positions and movements of the lower jaw relative to the upper jaw,

comprising a rigid first holder to be secured in a fixed relationship to the upper jaw to the patient's head, a rigid second holder to be secured to the lower jaw and a plurality of distance measuring devices including a respective transmitter and receiver which are provided at the holders to determine the positions of the holders relative to each other,

wherein at one of said first and second holders, there are fixed at least three successively activatable transmitters for ultrasonic signals,

at the other holder there are mounted at least three receivers for ultrasonic signals, means for activating the transmitters in succession with intervals therebetween that are longer than the maximum transit time of the ultrasonic signals between a transmitter and a receiver, and each of said at least three receivers having means for receiving the ultrasonic signals of all the transmitters of the one holder,



whereby a distance value between a transmitter and each of the receivers can be determined for each of the transmitters.

4,673,353

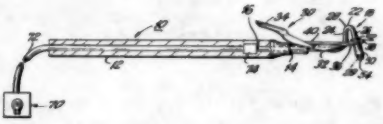
APPARATUS FOR APPLYING A LIGHT-CURABLE DENTAL COMPOSITION

Donald M. Nevin, 3 Clearmeadow Ct., Woodbury, N.Y. 11797

Filed May 30, 1986, Ser. No. 869,148

Int. Cl.[4] A61C *5/04*

U.S. Cl. 433—90 **9 Claims**



1. An apparatus for applying a light-curable dental composition to teeth while exposing the composition to a curing light, comprising:

an opaque receptacle having an interior cavity which can hold the dental composition; the receptacle having first and second openings in opposite ends thereof communicating with the cavity; the first opening being adapted to allow the receptacle to pick up the dental composition and hold it within the cavity; and

an elongated plunger having opposite ends; one end of the plunger being the working end which extends through the second opening in the receptacle into its cavity; the other end of the plunger being connected to a source of the curing light; the plunger being made of a clear material capable of transmitting light between its ends and the plunger being coated on its side surfaces, between its ends, with a substantially opaque coating which prevents light, transmitted between its ends, from being substantially visible between its ends; the working end of the plunger being adapted to be moved further into the cavity of the receptacle towards its first opening to urge dental composition within the cavity outwardly of the receptacle through its first opening and onto a tooth.

4,673,354

STABLE SILANOL PRIMING SOLUTION FOR USE IN DENTISTRY

Scott R. Culler, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 1, 1985, Ser. No. 782,428
Int. Cl.[4] A61C 5/00
U.S. Cl. 433—217.1 22 Claims

1. A method for priming a dental material comprising the steps of:

(a) applying to said material a liquid layer of acidic, non-hazy, silanol priming solution comprising:

(i) substantially fully hydrolyzed organofunctional silanol,

(ii) water, and

(iii) volatile alcohol or ketone solvent, said solvent being miscible with water in all proportions, having between two and four carbon atoms, and having a boiling point between about 50° and 125° C.,

said solution containing a sufficiently low amount of silanol and sufficiently high amounts of solvent and acid to have a priming strength in excess of the cohesive strength of dental porcelain after storage of said solution at room temperature for at least about 45 days, and

(b) allowing said layer to dry.

4,673,355

SOLID CALCIUM PHOSPHATE MATERIALS

Edward T. Farris, 4715 Greenville Ave., Dallas, Tex. 75206; John J. Barsa, 60 Haven Ave., New York, N.Y. 10032; Richard J. Lagow, 6204 Shadow Mountain Dr., Austin, Tex. 78731, and Paul J. Capano, 1730 E. Oltorf, Austin, Tex. 78741

Continuation of Ser. No. 436,615, Oct. 25, 1985, abandoned.
This application Aug. 9, 1985, Ser. No. 764,515
Int. Cl.[4] C08L 93/04; C09K 3/00; C01B 25/32; A61F 1/24
U.S. Cl. 433—218 31 Claims

1. A method of producing a nonapatitic solid material containing calcium and phosphate, comprising the steps of:

a. forming a reactant mixture of calcium ions and phosphate ions in phosphoric acid, the mixture having a calcium to phosphate ratio of about 0.1 to about 1.34;

b. heating the mixture to a molten state of above about 750° C. at which the ions react; and

c. cooling the reaction mixture thereby forming a nonapatitic solid calcium phosphate material.

4,673,356

IN-FLIGHT PROBLEM SITUATION SIMULATOR

Bruce C. Schmidt, 1211 Mohawk, DeRidder, La. 70634

Filed Oct. 8, 1985, Ser. No. 785,454
Int. Cl.[4] G09B 9/08
U.S. Cl. 434—35 10 Claims

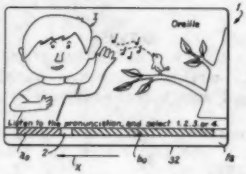
1. An in-flight training apparatus for instructing pilots to recognize and properly react to in-flight problem situations and for simulating in-flight problem situations within an airplane having a true instrument comprising a true instrument display surface which displays a true instrument reading, said in-flight training apparatus comprising a false instrument display surface comprising a rear portion and a front portion, which front portion displays a false instrument reading different from the true instrument reading, said false instrument display surface being adapted to attach to substantially cover the true instrument reading and to display the false instrument reading to simulate a problem situation by covering and obscuring the true instrument display surface.

4,673,357

TEACHING MACHINE

Takamasa Ito, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Oct. 17, 1984, Ser. No. 663,064
Claims priority, application Japan, Oct. 17, 1983, 58-193675
Int. Cl.[4] G09B 5/04
U.S. Cl. 434—311 6 Claims



1. A teaching machine adapted to pose a question to a user of the machine and to accommodate both a first case wherein a voice signal is audibly reproduced before the entry into the machine of the user's answer to the question and a second case wherein a voice signal is audibly reproduced after the entry into the machine of the user's answer, said machine comprising:

a card formed with a single magnetic track, there being a control signal, a correct-answer signal encoding a correct answer to said question, and a voice signal recorded in series on said single magnetic track;

signal reproducing means adapted for movement relative to said card and for sequential reproduction first of said control signal and then of the remaining ones of said recorded signal and then of the remaining ones of said recorded signals in response to said relative movement, at least said control signal being formed of a plurality of bits capable of distinguishing at least said first and second cases;

entry means by which a user of the machine can enter into said machine a test answer to said question;

first memory means responsive to said correct-answer signal as reproduced by said signal-reproducing means for storing said correct answer;

second memory means responive to said entry means for storing said test answer;

comparator means jointly responsive to said first and second memory means for making a comparison between said correct answer and said test answer and for producing an output signal in accordance with said comparison;

signaling means responsive to said comparator output signal for indicating to said user whether said test answer is correct; and

audio means controlled by said control signal so that said audio means audibly reproduces said voice signal before making said comparison in said first case and after making said comparison in said second case.

4,673,358

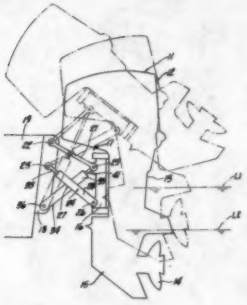
MOUNTING ARRANGEMENT FOR OUTBOARD DRIVE

Tomio Iwai, Hamamatsu, and Ryoji Nakahama, Iwata, both of Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed May 15, 1985, Ser. No. 734,453
Claims priority, application Japan, May 22, 1984, 59-101647
Int. Cl.[4] B63H 21/26
U.S. Cl. 440—61 46 Claims

1. A supporting arrangement for suspending a marine out-

board drive from the transom of an associated watercraft for movement from a tilted down running condition to a tilted up out of the water condition comprising a first inextensible link adapted to be pivotally connected at one of its ends to the associated transom at a first pivot axis fixed relative to said transom. means pivotally connecting the other end of said first link to said outboard drive at a second pivot axis fixed relative to said outboard drive, a second link adapted to be pivotally connected at one of its ends to the associated transom at a third



pivot axis fixed relative to said transom, means for pivotally connecting the other end of said second link to said outboar drive at a fourth pivot axis, fixed relative to said outboard drive, said first and said third pivot axes being fixed relative to each other, said second and said fourth pivot axes being fixed relative to each other, and all of said pivot axes being offset and parallel to each other, and means for changing the effective length of said second link to accommodate movement of said outboard drive relative to the transom of the associated watercraft from its tilted down position toward it tilted up position.

4,673,359

WATER PUMP FOR MARINE PROPULSION DEVICES

Daniel M. Gust, Libertyville, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Continuation of Ser. No. 604,930, Apr. 27, 1984, abandoned. This application Oct. 30, 1985, Ser. No. 793,715

Int. Cl.[4] B63H *21/38*

U.S. Cl. 440—88 **20 Claims**

9. A fluid pump assembly comprising a substantially circular drive shaft including a flat side, an impeller hub including an inner surface formed, in part, by a circular bore receiving said drive shaft and, in part, by a generally crescent-shaped keyway adjoining said bore and defined, in part, by an arcuate surface including a first end which extends smoothly from said bore, and a retainer key positioned in said keyway and having an arcuate surface complementary with said arcuate surface of said keyway and including an end, a flat surface which has a first end extending from said end of said arcuate surface of said retainer key, which is complementary with said flat side of said drive shaft, which, at said first end and in cooperation with said arcuate surface of said retainer key, defines a pointed end, and which has a second end, and a blunt end located at said second end.

4,673,360

BUILT-IN TANK CONTAINING LUBRICANT OR THE LIKE FOR OUTBOARD MOTORS

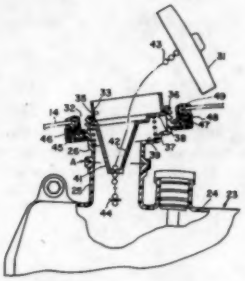
Akinori Kojima, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Continuation of Ser. No. 629,347, Jul. 10, 1984, abandoned. This application Mar. 21, 1986, Ser. No. 841,683

Claims priority, application Japan, Jul. 21, 1983, 58-131854

Int. Cl.[4] B36B *35/00*

U.S. Cl. 440—88 **7 Claims**



1. An outboard motor having a power head containing an internal combustion engine, a protective cowling as a part of said outboard motor encircling said engine and defining an opening, a fluid tank contained within said protective cowling and having a filler neck terminating contiguous to said opening and substantially flush with an outer surface of said protective cowling, a cap having a screw type connection to said filler neck to be detachably affixed to said filler neck, a sleeve slidably supported within said neck in an axial direction relative to said filler neck between a retracted position in which said sleeve does not extend substantially beyond said protective cowling and an extended position in which the outer end of said sleeve extends substantially beyond said protective cowling to assist in filling said tank, means for retaining said sleeve relative to said neck for movement between said positions, said sleeve being engageable by said cap when said cap is reinstalled on said filler neck in an axial direction for returning said sleeve from its extended position back to its retracted position, and sealing means engaged with said filler neck around its periphery and with said protective cowling for precluding entry of foreign matter into said protective cowling through said opening.

4,673,361

KAYAK/CANOE PADDLE

William P. Harvey, Undermountain Rd., Box 462, Salisbury, Conn. 06068

Filed Jan. 17, 1986, Ser. No. 820,425

Int. Cl.[4] B63H *16/04*

U.S. Cl. 440—101 **9 Claims**

1. An integrally constructed paddle comprising:

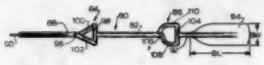
(a) a first paddle blade;

(b) a first shaft fixedly mounting said blade at one end thereof;

(c) a first handle structure, said first handle structure being fixedly mounted at an opposite end of said first shaft and including at least one first crossbar forming part of said handle structure and with the axis thereof oriented perpendicular to the axis of said first shaft;

(d) a second shaft substantially longer than said first shaft

fixedly secured to said first crossbar and forming a continuation of and in axial alignment with said first shaft; and



(e) a second crossbar having its axis oriented perpendicular to the axis of said second shaft and fixedly secured thereto at a position spaced outwardly from said first crossbar.

4,673,362

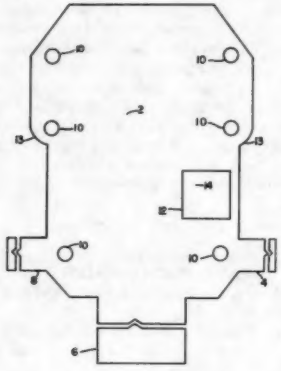
MARINE STERN DRIVE COVER

David Mercer, 600 Edgeworth St., Middlesex, N.J. 08846

Filed Feb. 8, 1985, Ser. No. 699,796

Int. Cl.[4] B63H *23/32*

U.S. Cl. 440—112 18 Claims



1. An apparatus for covering a stern drive aperture in the hull of a boat which comprises: a planar plate defining top and bottom surfaces and side portions; a plurality of planar arm members projecting outwardly from the sides of said plate and being in the same planes as said plate; said plate having a hole therethrough perpendicular through the planes of its top and bottom surfaces; and a hollow vessel having an opening at one end thereof; said vessel being attached to said plate such that said opening and said hole are in juxtaposition.

4,673,363

MARINE MEASUREMENT DEVICE

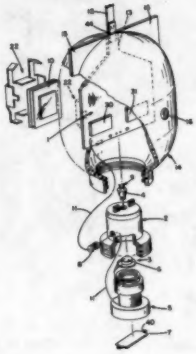
Alan T. Hudson, Mattapoisett; David P. Gagnon, East Sandwich; David W. Johns, II, Marion, and William J. Langenbein, Jr., S. Dennis, all of Mass., assignors to Sippican Ocean Systems, Inc., Marion, Mass.

Continuation of Ser. No. 504,571, Jun. 15, 1983, abandoned.

This application Nov. 8, 1985, Ser. No. 797,175

Int. Cl.[4] B63B *22/00, 22/20, 22/26*

U.S. Cl. 441—1 29 Claims



1. A sensor buoy such as a sonobuoy, said buoy comprising a terminal weight and sensor for deployment beneath the surface of the water after said buoy impacts the water,

a circuit assembly and antenna for processing the output of said sensor and transmitting a signal,

a cable for connecting said sensor to said circuit assembly, and a housing, said housing comprising a blow molded seamless thermoplastic shell, said housing surrounding said circuit assembly.

27. The method of fabricating an electronic circuit assembly and surrounding housing, said method comprising the steps of

installing high-temeprature-intolerant electronic components on a circuit board, said components including semiconductor components having a maximum exposure temperature,

extruding a tube of molten thermoplastic material fully around said circuit board and components, the temperature of said molten material exceeding said maximum exposure temperature,

molding said tube between sections of a mold and injecting high pressure gas so as to blow mold a thermoplastic shell around said circuit board,

completing said extruding and molding steps quickly enough to prevent said semiconductor components from being heated to said maximum exposure temperature.

4,673,364

SWIMMING APPARATUS

Jeong R. Kim, 53 Sogcok-Dong Jongro-Ku, Seoul, Rep. of Korea

Filed Aug. 6, 1986, Ser. No. 893,655

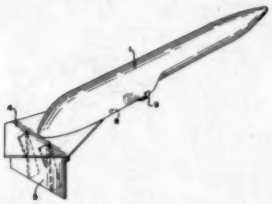
Claims priority, application Rep. of Korea, Aug. 9, 1985, 10251/1985[U]

Int. Cl.[4] A63B *31/12*

U.S. Cl. 441—59 1 Claim

1. A swimming apparatus comprising a generally cylindrical main body, having a plurality of internal chambers and a plurality of partition walls for maintaining the buoyancy of the apparatus, said partition walls being integrally positioned within the internal chamber of said body, a planar face plate attached to said body and positioned at the front lower portion of said body, a flange hingedly attached to the underside of said face plate, first wedge-shaped members affixed to said face

plate and positioned in front of said pivotally mounted flange and second wedge-shaped members attached to the rear face of said pivotally mounted flange, said members restrict and control the movement of said flange with respect to said body and



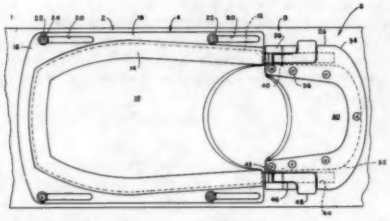
said faceplate, and an arm retaining assembly for supporting the arm of a person using the apparatus, said arm retaining assembly including a plurality of walls downwardly extending from said body, a handle and an arm strap, said handle and said arm strap are positioned between said walls.

4,673,365

WATER SKI BINDER

Robert S. Scheurer, P.O. Box 539, Wichita Falls, Tex. 76307, and Kendal Hancock, Wichita Falls, Tex., assignors to Robert S. Scheurer, Wichita Falls, Tex.

Filed May 1, 1985, Ser. No. 729,127
Int. Cl.[4] B63H *5/16*
U.S. Cl. 441—70 **15 Claims**



1. Adjustable toe binder apparatus comprising:
a flexible instep and toe cover having peripheral edges, grip means for gripping the peripheral edges and slide means for supporting the grip means and peripheral edges for movement with the slide means, guiding means mounted on the slide means for guiding the slide means forward and rearward, first locking means mounted on the slide means and second locking means connected to a fixed heel support for cooperating with the first locking means to selectively permit and prevent movement of the slide means.

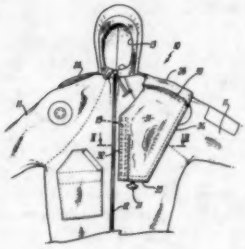
15. The method of adjusting a water ski binding comprising:
a toe portion movable relative to a ski and a fixed heel portion,
sliding the toe portion rearward and moving rearward extensions on the toe portion into complementary tunnels in the heel portion and moving cams on the heel portion into upward facing detents on the rearward extensions to lock the toe portion in place.

4,673,366

EXPOSURE SUIT WITH AN ATTACHED LIFEJACKET

James M. Hawkins, Huntington, England, assignor to BTR PLC, London, England

Filed Dec. 3, 1985, Ser. No. 804,105
Claims priority, application United Kingdom, Dec. 5, 1984, 8430726
Int. Cl.[4] B63C *9/16*
U.S. Cl. 441—90 **19 Claims**



1. An exposure suit comprising:
a suit constructed of flexible protective material and having a neck portion, shoulder portions, a waist portion and a chest portion, each said portion, in use, overlying a corresponding body part of a wearer,
a linear sealable front opening located in said chest portion and extending between said neck portion and said waist portion,
a life jacket secured to said suit, said life jacket including a rear inflatable portion overlying said shoulder portions and a rear part of said neck portion and a front inflatable portion secured to said chest portion at least at a central part thereof and being located on only one side of said sealable front opening,
restraining means for restraining said front inflatable portion in a deflated condition to form a package overlying a part of said chest portion on said one side of said sealable front opening so as to leave said sealable front opening fully operational whilst said front inflatable portion is in said deflated condition,
inflation means for inflating said inflatable portions, and
said front inflatable portion, in an inflated condition forms a buoyancy body overlying both sides of said sealable front opening and having a center overlying a central portion of said chest portion.

4,673,367

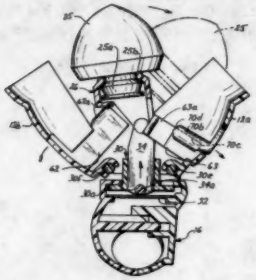
ANIMATED FIGURE TOY

Ronald H. MacBain, Los Angeles, Calif., assignor to Mattell, Inc., Hawthorne, Calif.

Filed Sep. 25, 1985, Ser. No. 780,061
Int. Cl.[4] A63H *33/00, 3/20, 19/00*
U.S. Cl. 446—4 **26 Claims**

1. In a figure toy, the combination comprising:
an upper torso having first and second portions configured for forming a generally hollow interior;
lower torso means;
coupling means attached to said lower torso means for hingedly coupling said first and second portions of said upper torso thereto;
post means moveably connected to said coupling means;
spring means coupled for biasing said post means to a first position and for enabling manual actuation of said post means against the bias to a second position;
interconnecting means on said first and second portions for coaction with said post means for maintaining said post means in said second position against the force of the bias of said spring means and for detachably retaining said

halves in an assembled position with said post means in said second position; and



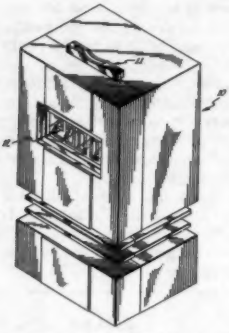
actuating means coacting with said interconnecting means for detachment thereof for enabling actuation of said post means to said first position for pivotally separating said first and second halves.

4,673,368

TOY BANK WITH NOVEL COIN DISCRIMINATING MECHANISM

Vincent N. Bush, Madison Lake, Minn., assignor to Playtronics Corporation, Mankato, Minn.

Filed Jul. 17, 1986, Ser. No. 887,076
Int. Cl.[4] A63H *33/30*
U.S. Cl. 446—8 **13 Claims**



1. A coin discriminating apparatus for discriminating between coins of varying diameters, comprising:

a. a housing having coin slot means in a surface thereof for receiving therein a coin inserted into the housing, said slot means including two generally flat, spaced walls defining therebetween the width of a coin passageway, and two relatively narrow, spaced sides defining therebetween the breadth of the passageway;

b. a movable slide disposed within the passageway, and being normally biased toward a resting position at least partially obstructing the breadth of the passageway and being movable in response to insertion of a coin; and

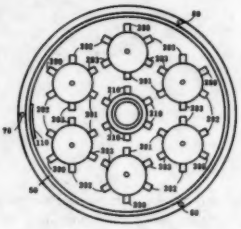
c. detection means operatively connected to said slide for detecting movement of the slide and relating said movement to coin diameter whereby when a coin is inserted through the passageway between the slide and a first of said sides the slide is displaced a distance related to the coin diameter, which displacement is detected by the detection means and related to the coin size.

4,673,369

MAGNETIC ALIGNMENT TOY

Vincent DiPietro, c/o Enzo Transmission, 250 Centre St., Quincy, Mass. 02169

Filed Oct. 24, 1985, Ser. No. 791,133
Int. Cl.[4] A63H *33/26*
U.S. Cl. 446—133 **7 Claims**



1. A magnetic alignment toy comprising:

a central rotatable wheel having at least two pairs of magnets disposed on the circumference of the central wheel, each of the magnets of each pair being disposed in 180 degree relationship to each other;

as many peripheral rotatable wheels as there are magnets on the central wheel, said peripheral wheels being evenly spaced around the central wheel and each having as many pairs of magnets disposed around its circumference as the central wheel has, and each magnet of each pair being in 180 degree relationship to each other;

a strong master magnet movable around the outside periphery of the peripheral wheels along a path bringing the master magnet into periodic magnetic interactive adjacency to the outermost magnet disposed on each peripheral wheel;

wherein the magnets disposed on all of the central and peripheral wheels alternate in polarity around each circumference of the wheels; and,

wherein the peripheral wheels are disposed around the central wheel so as to allow periodic magnetic interactive adjacency of the magnets on the peripheral wheels with the magnets on the central wheel when any of the wheels are rotated.

4,673,370

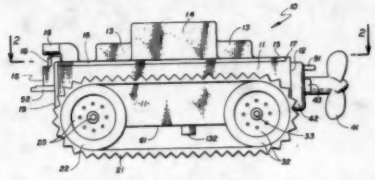
TOY FOUR-WHEEL-DRIVE CLIMBING VEHICLE OPERABLE ON LAND, OVER WATER, AND UNDER WATER

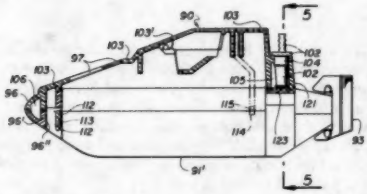
Adolph E. Goldfarb, 1432 S. East Wind Cir., Westlake Village, Calif. 91361; Delmar K. Everitt, Morro Bay, Calif., and Drew Plakos, Bloomington, Minn., assignors to Adolph E. Goldfarb, Northrdige, Calif.

Continuation-in-part of Ser. No. 788,052, Oct. 16, 1985, which is a continuation-in-part of Ser. No. 463,999, Feb. 4, 1983, Pat. No. 4,547,166, and a continuation-in-part of Ser. No. 417,554, Sep. 13, 1982, Pat. No. 4,492,058, which is a continuation-in-part of Ser. No. 233,495, Feb. 11, 1981, abandoned, which is a continuation-in-part of Ser. No. 121,645, Feb. 14, 1980, Pat. No. 4,306,375. This application Feb. 10, 1986, Ser. No. 827,887
Int. Cl.[4] A63H *23/04, 29/22*
U.S. Cl. 446—162 **23 Claims**

1. An amphibious toy vehicle capable of operating along a solid surface in air and also capable or self-propulsion selectively either (a) along a solid surface that is at the bottom of a body of water or (b) along the top free surface of a body of water; said vehicle also being capable of self-propulsion continuously over a boundary between such a solid surface in air and such a body of water, using selectably either such solid bottom or free top surface of such body of water; said vehicle being for use with electrical battery means, and comprising:

a chassis;
wheel means rotatably mounted to the chassis and adapted for propulsion of the vehicle along a solid surface;
an electrical motor mounted to the chassis and mechanically connected to drive the wheel means;
battery-support and connection means adapted to receive such electrical battery means and to electrically connect the battery to power the motor;
a separate stylized vehicle body configured to represent an amphibious vehicle and comprising variable flotation-chamber means, removably mounted to the chassis and imparting a variable amount of buoyancy to the vehicle, sdid amount of buoyancy varying between (a) a first value that is low enought to cause the vehicle to sink to such

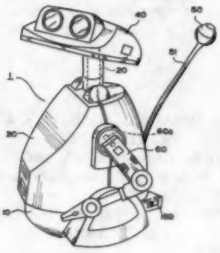




solid surface at the bottom of a body of water and (b) a second value that is high enough to cause the vehicle to float along such a top free surface of a body of water; and
manually manipulable means for varying the buoyancy of the flotation-chamber means in said removably mounted separate body;
whereby a user by manipulating the buoyancy-varying means in the removably mounted separate body may select operation of the vehicle either along such solid surface at the bottom of a body of water or along such free surface at the top, at the user's discretion; and
whereby the vehicle operates continuously over a boundary between such a solid surface in air and such a body of water, but using selectably either such solid bottom or free top surface of such body of water.

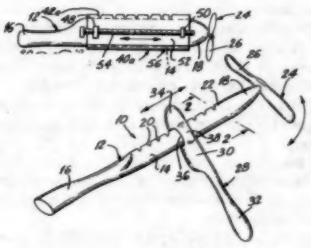
4,673,371
ROBOT-LIKE TOY VEHICLE
Masami Furukawa, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Nov. 22, 1985, Ser. No. 800,766
Claims priority, application Japan, Apr. 26, 1985, 60-62996[U]; Apr. 26, 1985, 60-62997[U]
Int. Cl.[4] A63H *30/00*
U.S. Cl. 446—175 **10 Claims**

10. A robot-like vehicle, comprising:
(a) an electric, reversible motor;
(b) a base;
(c) a drive wheel connected to the motor via a gear train and a pair of follower wheels for propelling the base;
(d) a housing rotatably mounted on the base including arms mounted for rotation relative to the housing;
(e) a swinging cylinder fixedly connected to the housing and operatively connected to the motor via a gear train for rotating the housing relative to the base;
(f) a support member mounted to the base;
(g) a head mounted to the support member for inclining and returning movement relative thereto;
(h) an elevation member mounted for up and down movement along the support;
(i) a cam operatively connected to the motor;
(j) a rotary lever operatively connected between the elevation member and the cam; and



(k) a manual switch and a microphone electrically connected to the motor via a circuit for controlling the motor,
wherein movement of the manual switch activates the motor, causes the drive wheel and follower wheels to propel the base, rotates the housing relative to the base, swings the arms, elevates the elevation member and inclines and returns the head, and
wherein audible activation of the micrphone causes the motor to stop movement and reactivates the elevation member to elevate and incline and return the head.

4,673,372
ROTARY DEVICE
Carlton Hall, 233 Broadway RM 3615, New York, N.Y. 10007
Filed Oct. 21, 1985, Ser. No. 789,450
Int. Cl.[4] A63H *1/02*
U.S. Cl. 446—239 **1 Claim**



1. A device for comverting vibratory pulses into rotary motion, which comprises:
(a) an elongated holder being generally a triangular rod having a handle formed on one end to be held in one hand of a user, a nose formed on other end and a series of notches formed in apex of said triangular rod;
(b) a prop element rotatably journaled to said nose of said elongated holder; and
(c) an activator to be held in other hand of said user for rubbing across said notches thus generating said vibratory pulses through said elongated holder so that said prop element will rotate by reason of said vibratory pulses, wherein said activator comprises a flat body portion having a handle formed on one end to be held in said other

hand of said user and a head formed on other end having a groove therein with a bulge on both sides over said groove for rubbing across said notches, further comprising a replaceable sheath having a series of notches formed in apex of said sheath so as to cover worn notches along apex of said triangular rod of said elongated holder, wherein said replaceable sheath further comprises:

(d) a pair of spaced apart flanges, each of said flanges mounted to same side of said sheath near each end thereof; and

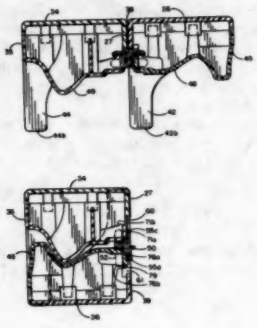
(e) an elongated adjustment bolt rotatably affixed within one of said flanges while threadably engaging other of said flanges so that when said bolt is turned in one direction said sheath will compress causing width of said notches to expand.

4,673,373

TRANSFORMABLE TOY BLOCK AND HINGE THEREFOR

Donald E. Herring, Redondo Beach, and Lawrence C. Wang, Los Angeles, both of Calif., assignors to Mattel Inc., Hawthorne, Calif.

Filed Nov. 5, 1985, Ser. No. 795,283
Int. Cl.[4] A63H *3/46*
U.S. Cl. 446—378 **18 Claims**



10. In an article having the form of a three-dimensional geometric toy block in a first position and the form of a figure or the like in a seoond position, the combination comprising:

a first genarally three-dimensional component;

a second generally three-dimensional component each of said first and second components having portions thereof configured for interengaging nesting relation in said first position;

a hinge mechanism interconnecting a corner of said first component with a corner of said second component to form, in the first position, a side of said block, said hinge mechanism including

first and second pairs of spaced generally U-shaped hinge couplers formed at the adjacent corners of said first and second components,

a hinge member having first and second generally parallel opposing side members and an interconnecting web portion with first and second sets of aligned hinge stub projections formed in said side members engaging said first and second pairs of U-shaped couplers, said hinge member, having an integrally formed plate portion extending transversely to said web portion and having oppositely extending generally resilient arm portions with tang means thereon; and

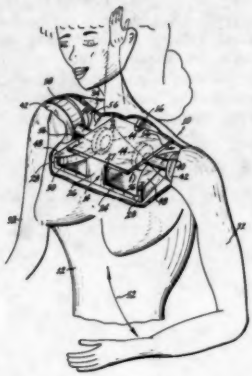
detent means on said first and second components engageable with said tang means for resiliently retaining said first and second components in said first and second positions.

4,673,374

ARTICULATED LIMB ASSEMBY FOR FIGURE TOY

William Kelley, Torrance, Calif., assignor to Mattel, Inc., Hawthorne, Calif.

Filed Jan. 24, 1986, Ser. No. 821,950
Int. Cl.[4] A63H *3/46*
U.S. Cl. 446—383 **6 Claims**



1. An articulated limb assembly for a figure toy having a hollow torso with a plurality of apertures comprising:

a supporting track mounted inside said hollow torso including a bottom plate, two curved portions extending upwardly from said bottom plate, a middle portion extending upwardly from said bottom plate and a top plate attached to said middle portion, each of said curved portions having a curved surface;

two limbs each having a generally spherically-shaped upper portion rotatably engaging one of said apertures in said hollow torso, each of said upper portions having a slot therein; and

two connectors operably coupled to said two limbs and to said supporting track, each of said two connectors having a head attached to one end thereof and a disk member attached to the other end thereof, each of said disk members rotatably engaging said slot in one of said upper portions so that each of said upper portions is capable of rotating about a first horizontal axis, each of said heads frictionally engaging said curved surface of one of said curved portions so that each of said upper portions and each of said connectors are capable of rotating about a common vertical axis and about a common second horizontal axis, each of said common second horizontal axes being perpendicular to one of said vertical axes and to one of said first horizontal axes and coinciding with a longitudinal axis of one of said connectors.

4,673,375

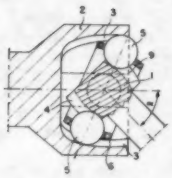
FRICTION COATING FOR CONTACTING ELEMENTS OF A CONSTANT VELOCITY JOINT

Rune Adolfsson, Borås, Sweden, assignor to SKF Nova AB, Gothenburg, Sweden

Filed Jan. 23, 1986, Ser. No. 824,568
Claims priority, application Sweden, Feb. 22, 1985, 8500869
Int. Cl.[4] F16D *3/23*
U.S. Cl. 464—145 **4 Claims**

1. In a constant velocity joint for torque transmitting interconnection of two relatively rotatable members comprising inner and outer parts connected to the members, a plurality of torque transmitting rolling elements having first contact surfaces mounted between and engaging second contact surfaces of the inner and outer parts in a contact zone and a retainer for

guiding the rolling elements, the improvement comprising a frictional coating on at least one of all of said first contact surfaces of said rolling elements and all of said second contact surfaces of both said inner and outer parts whereby the coefficient of friction in the contact zone is considerably greater than the friction coefficient in a corresponding contact zone between first and second contact surfaces made of steel to reduce the contact stresses between the rolling elements and the retainer.

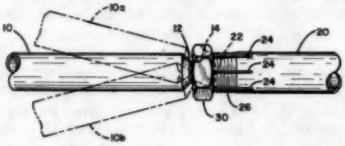


4,673,376

UNIVERSAL COUPLING

Norman N. Fender, Hudson, Mich., assignor to Graco Robotics, Inc., Livonia, Mich.

Filed Jul. 16, 1986, Ser. No. 886,120
Int. Cl.[4] F16D *3/18*
U.S. Cl. 464—158 **7 Claims**



1. A universal coupler for attaching two members together along an axis and for permitting limited off-axis displacement of either of the members and for transmitting rotational torque therebetween, comprising

(a) a male coupler affixed to one of said members, said male coupler comprising a narrowed neck portion and a curved polyhedron head attached thereto and having a plurality of curved faces;

(b) a female coupler affixed to the other of said members, said female coupler comprising a socket having interior polyhedron faces corresponding in number to said polyhedron head curved faces, and having a plurality of slots therethrough, each slot separating adjacent polyhedron faces, said female member further comprising a tapered exterior threaded portion extending substantially over said socket and at least partially along said slots; and

(c) a threaded locknut fitted to said threaded portion.

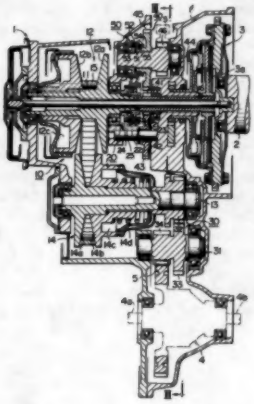
4,673,377

BELT-PULLEY TYPE STEPLESSLY VARIABLE TRANSMISSION HAVING A REVERSE DRIVE GEAR MECHANISM

Hitoshi Akutagawa, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Continuation of Ser. No. 716,247, Mar. 26, 1985, abandoned.
This application Sep. 24, 1986, Ser. No. 910,858
Claims priority, application Japan, Mar. 28, 1984, 59-61328
Int. Cl.[4] F16H *9/00, 37/06*
U.S. Cl. 474—1 **9 Claims**

1. A steplessly variable power transmission mechanism comprising an input member, a belt-pulley type transmission having an input shaft for carrying driving pulley means of a variable effective diameter, an output shaft for carrying driven pulley means of variable effective diameter and belt means for connecting the driving and driven pulley means so that power can be transmitted between the driving and driven pulley means, reverse gear means provided with a first idler shaft having an idler gear means for engaging with said input member and a second idler shaft having an intermediate gear means in engagement with the idler gear means of the first idler shaft, said first and second idler shafts being disposed in parallel with said input member, output means connected with said output shaft of the belt-pulley type transmission and said reverse gear means, first selecting means provided on said input member for connecting said input member with said input shaft of the



belt-pulley type transmission, second selecting means provided on said first idler shaft for connecting said intermediate gear means of the second idler shaft with said idler gear means of the first idler shaft, said first and second selecting means being located within substantially the same plane perpendicular to the longitudinal direction of the input member, said first and second selecting means being adapted to be actuated alternately to the respective engaged positions thereof, whereby driving power is transmitted from said input member through said reverse gear means to said output means in bypassing the belt-pulley type transmission when the reverse gear means is actuated.

4,673,378

HYDRAULIC CONTROL APPARATUS FOR A CONTINUOUSLY VARIABLE TRANSMISSION

Setsuo Tokoro; Takashi Shigematsu, and Tomoyuki Watanabe, all of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Division of Ser. No. 606,467, May 3, 1984, Pat. No. 4,631,043.
This application Sep. 3, 1986, Ser. No. 903,386
Int. Cl.[4] F16H *11/06*
U.S. Cl. 474—18 **12 Claims**

1. A hydraulic control apparatus for controlling a RPM of an engine in a motor vehicle using a continuously variable transmission, the transmission having a driving pulley mounted on an input shaft, the driving pulley comprising a fixed member and a moveable member, said moveable member being actuated by a hydraulic cylinder to form a V-shaped opening between said moveable member and said fixed member, a driven pulley mounted on an output shaft, the driven pulley comprising another fixed member and another moveable member, said another moveable member being similarly actuated by another hydraulic cylinder supplied with a line pressure to form another V-shaped opening between said another moveable member and said another fixed member, and an endless belt member spanning the driving and driven pulleys so that an

effective diameter of the pulleys can be varied with regard to each other so that different speed ratios can be obtained comprising:

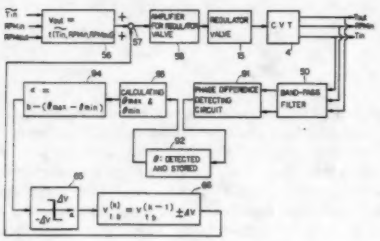
first detecting means for detecting a first phase of a frequency component of an input torque on the input shaft of the driving pulley generated by the power stroke of the engine, and for outputting an input torque signal, said first detecting means being in communication with said input shaft;

second detecting means for detecting a second phase of a frequency component of an output torque on the output shaft of the driven pulley generated by the power stroke of the engine, and for outputting an output torque signal, said second detecting means being in communication with said output shaft;

a control circuit including:

first calculating means in communication with said first and second detecting means for receiving the input and output torque signals for calculating first differences at a plurality of points in time between the first phase detected by the first detecting means and the second phase detected by the second detecting means, the first calculating means outputting at least a first calculated signal having a maximum value of the first differences between the first and second phases and a second calculated signal having a minimum value of the first differences between the first and second phases;

second calculating means in communication with said first calculating means for receiving the first and second calculated signals from the first calculating means, and calculating a second difference between the maximum value of the first calculated signal and the minimum value of the second calculated signal, the second calculating means outputting a third calculated signal, the third calculated signal being indicative of the second difference;



memory means for storing a predetermined value;

comparison means in communication with said memory means and said second calculating means for receiving the third calculated signal and the predetermined value, and for comparing the second difference of the third calculated signal with the predetermined value stored in the memory means, the comparison means outputting a comparison signal indicative of the result of the comparison; and

hydraulic fluid control means for receiving said comparison signal and for controlling the line pressure supplied to said another hydraulic cylinder of the driven pulley in accordance with the comparison signal, whereby said control means decreases the line pressure when the second difference of the third calculated signal is less than said predetermined value and increases the line pressure when the second difference of the third calculated signal is greater than said predetermined value.

5. A method for controlling a RPM of an engine in a motor vehicle using a continuously variable transmission, the transmission having a driving pulley mounted on an input shaft, the driving pulley comprising a fixed member and a moveable member, said moveable member being actuated by a hydraulic cylinder to form a V-shaped opening between said moveable member and said fixed member, a driven pulley mounted on an output shaft, the driven pulley comprising another fixed member and another moveable member, said another moveable member being similarly actuated by another hydraulic cylinder supplied with a line pressure to form another V-shaped opening between said another moveable member and said another fixed member, an endless belt member spanning the driving and driven pulleys so that an effective diameter of the pulleys can be varied with regard to each other so that different speed ratios can be obtained, first and second detecting means, and a control circuit, said control circuit including first and second calculating means, memory means, comparison means, and hydraulic fluid control means, said method comprising the steps of:

detecting an input torque on the input shaft, a rotating speed of the input shaft and a rotating speed of the output shaft;

calculating an initial input voltage for a regulator valve which controls the line pressure of said another hydraulic cylinder;

detecting an output torque on the output shaft;

detecting a first phase of a frequency component of an input torque on the input shaft;

detecting a second phase of a frequency component of an output torque on the output shaft;

calculating first differences at a plurality of points in time between the detected first phase and the detected second phase;

calculating a second difference between maximum and minimum values of the first differences;

comparing said calculated second difference with a first predetermined value, and determining a compensating voltage in accordance with said comparison;

adding the compensating voltage to a previous feedback voltage value when said calculated second difference is greater than or equal to said first predetermined value, and substracting the compensating voltage from the previous feedback voltage value when said calculated second difference is less than said predetermined value to create a compensated feedback voltage value; and

determining a new input voltage for the regulator valve using the compensated feedback voltage value.

4,673,379

INFINITELY VARIABLE TRANSMISSION

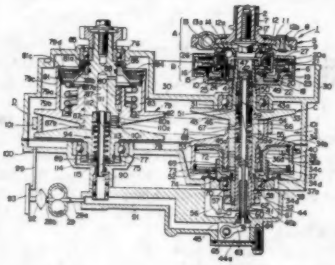
Kohei Ohzono, Saitama; Mitsuru Saito, Tokyo; Kiyotaka Hayashi, and Taiji Fujita, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 25, 1985, Ser. No. 780,118

Claims priority, application Japan, Sep. 26, 1984, 59-201198; Nov. 1, 1984, 59-230631; Nov. 5, 1984, 59-166424; Dec. 20, 1984, 59-267507

Int. Cl.[4] F16H *11/04*

U.S. Cl. 474—28 **7 Claims**



1. An infinitely variable transmission comprising:

a driver shaft drivable by a source;

a driven shaft drivable by power transmitted from said driver shaft;

driver and driven pulleys mounted respectively on said driver and driven shafts;

each of said driver and driven pulleys comprising a fixed conical disc fixed to one of said driver and driven shafts and a movable conical disc mounted axially slidably on said one of said driver and driven shafts, said fixed and movable conical discs jointly defining a V-shaped groove, said movable conical disc having a pressure chamber therebehind which has a volume variable under a fluid pressure for moving the movable conical disc;

an endless belt trained around said driver and driven pulleys and engaging in the V-shaped grooves;

means for supplying a fluid under pressure to said pressure chamber;

a pressure regulating mechanism for regulating the fluid pressure at a prescribed pressure;

a fluid metering mechanism for regulating the amount of the fluid under said prescribed pressure in said pressure chamber; and

at least one of said pressure regulating mechanism and said fluid metering mechanism being disposed in one of said driver and driven shafts.

4,673,380

IDLER ROLLER

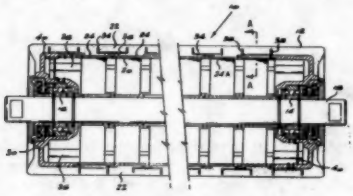
Horst R. Wagner, Transvaal, South Africa, assignor to Horst Reinhold Wagner, Trustee, H&L Wagner Family Trust, Transvaal, South Africa

Filed Oct. 16, 1985, Ser. No. 787,890

Claims priority, application South Africa, Oct. 17, 1984, 84/8101

Int. Cl.[4] F16H *55/36*

U.S. Cl. 474—90 **11 Claims**



1. An idler roller comprising a roller body which comprises a core having a bore to accommodate an idler shaft and a shell of a plastic material located around the core to provide a tubular load-bearing wall, bearing assemblies located within the roller body at a first end and a second end thereof for receiving the idler shaft, a metallic insert embedded in the shell, the insert spiralling around the core for substantially its whole length, and electrically conductive means connecting the insert to at least one of the bearing assemblies, the insert and the electrically conductive means being adapted to drain any electrostatic charge formed on the surface of the shell away from the shell via the bearing assembly to the idler shaft.

4,673,381

CARTONING MACHINE HAVING AUXILIARY FLAP SEALER

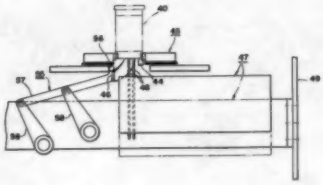
Hisashi Yamamoto, and Yukio Konaka, both of Kanazawa, Japan, assignors to Shibuya Kogyo Co., Ltd., Kanazawa, Japan

Continuation of Ser. No. 624,869, Jun. 27, 1984. This application Mar. 11, 1986, Ser. No. 838,496

Claims priority, application Japan, Jul. 6, 1983, 58-122975

Int. Cl.[4] B31B *1/36, 1/52, 1/62*

U.S. Cl. 493—128 **1 Claim**



1. Apparatus for adhesively affixing together an inner flap and an outer flap of a container box which when adhesively affixed together form part of one surface of said box, said surface being located in a downward orientation while said outer flap and said inner flap are being adhesively affixed, comprising:

transporting means for transporting said box along a predetermined path;

applying means disposed along said path for applying an adhesive agent to said inner flap, and means for moving said applying means to a first position beneath said box in which position said adhesive agent is applied to said inner flap and to a second position beneath said box in which position said adhesive agent is not applied;

first folding means disposed along said path downstream of said applying means for folding said outer flap against said inner flap, thereby having said inner and outer flaps adhesively affixed together; and

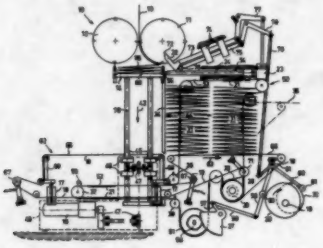
second folding means disposed along said path adjacent said applying means for folding said outer flap affixedly against said inner flap only when said transporting means is brought to a halt, said second folding means including a pressure member, and means for moving said pressure member between a retracted position where said pressure member is held inoperative and an advanced position where said pressure member folds said outer flap said means for moving said applying means being actuated to move said applying means to said second position when said means for moving said pressure member is actuated to move said pressure member to said advanced position, thereby avoiding interference between said applying means and said pressure member;

wherein said transporting means for transporting said box along a predetermined path includes box supports located beneath that edge of said box to which said inner flap is attached, said box supports holding said inner flap in a final position while allowing for application of said adhesive agent to said inner flap, and allowing for attachment of said outer flap to said inner flap by said first folding means when said applying means is in said first position and by said second folding means when said applying means is in said second position.

4,673,382
APPARATUS FOR FORMING FOLDED STACKS FROM A WEB

Hermann Buck, Dettingen/Erms, and Werner Sommer, Beuren, both of Fed. Rep. of Germany, assignors to Bielomatik Leuze GmbH & Co., Fed. Rep. of Germany

Filed Jan. 22, 1986, Ser. No. 821,390
Claims priority, application Fed. Rep. of Germany, Jan. 23, 1985, 3502176
Int. Cl.[4] B65H *45/20*
U.S. Cl. 493—359 21 Claims



1. An apparatus for forming folded stacks from a web, comprising:

folding means for bending the webs at folding edges into multiple layers forming the stack,

a stacking zone being defined adjacent to the folding means, in which stacking zone the stack is accumulated and is carried by stacking table means,

separating means movable by separating drive means along a plane substantially parallel to the layers of the stack, thereby performing an inserting movement of the separating means into the stack and a retracting movement from the stack in said plane, the separating means being provided with frontal severing means for separating from each other during said inserting movement two adjacent layers of the stack at adjacent folding edges, and thereby separating the stack into an upper stack part and a lower stack part, the separating means being adapted to at least temporarily carry the upper stack part,

stack removal means provided at a lower end of the stacking zone for removing the lower stack part from the stacking zone and from the stacking table means, the stacking table means being movable in a substantially vertical direction from an upper level adjacent to the separating means to a lower level adjacent to the stack removal means by vertical movement means, and said stacking table means being movable substantially horizontally by horizontal displacement means between a position beside and outside the stacking zone and a position inside the stacking zone,

the stacking table means being sequentially movable by said vertical movement means and said horizontal displacement means

from the lower level to the upper level while the stacking table means is in the position beside and outside the stacking zone,

from the outside position to the inside position while the stacking table means is on the upper level, the stacking table means closely following the separation means during the retracting movement and thereby resuming support of the upper stack part upon retraction of the separation means,

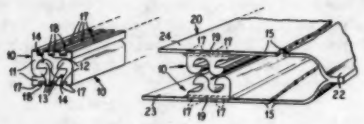
from the upper level to the lower level in the inside position, during which movement the stack is accumulated on the stacking table, and,

from the inside position to the outside position on the lower level after the stack is transferred from the stacking table means to the removal means.

4,673,383
FUSIBLE RIB BONDING OF FASTENERS TO SUBSTRATE

Per Bentsen, Suffern, N.Y., assignor to Minigrip, Incorporated, Orangeburg, N.Y.

Filed Nov. 12, 1985, Ser. No. 797,147
Int. Cl.[4] B31B *23/90*
U.S. Cl. 493—381 12 Claims



1. A method of attaching plastic separable fastener strip to a substrate which comprises:

providing an extruded thermoplastic fastener strip having a base surface and profile means projecting on said strip opposite to said base surface for separably interlocking with complementary profile means on a companion fastener strip;

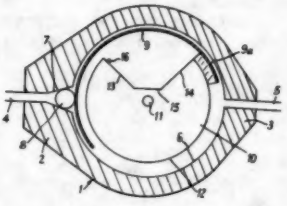
providing on said base surface, and as an integral part of the extruded strip, ribs of substantially less mass than said profile means and relatively closely spaced from one another; and

fusing said ribs into a bonding layer and thereby bonding said base surface to the substrate by subjecting said strip to heat in an amount to place said ribs in a fusible condition but not to deform said profile means owing to said different masses thereof.

4,673,384
VALVE FOR THE TREATMENT OF HYDROCEPHALUS

Bernard Marion, Montreuil sur Ille, France, assignor to Sophysa, Montreuil sur Ille, France

Filed Apr. 14, 1986, Ser. No. 851,326
Int. Cl.[4] A61B *5/00;* A61M *27/00*
U.S. Cl. 604—10 3 Claims



1. In a subcutaneous valve for the treatment of hydrocephalus adapted to be inserted and connected between a ventricular catheter and a distal catheter, said valve comprising:

a valve body formed with a cylindrical chamber having a cylindrical wall and a bottom wall;

an inlet formed in said cylindrical wall and connectable to said ventricular catheter, an outlet formed in said cylindrical wall opening into said chamber and connectable to said draining catheter;

means forming a valve seat at said inlet;

a valve member juxtaposed with said valve seat and engageable therewith to block flow from said chamber to said ventricular catheter but displaceable away from said valve seat to permit flow from said ventricular catheter into said chamber;

a rotor journaled in said chamber for rotation about the axis of said chamber;

a spring blade fixed to said rotor, extending arcuately along

said wall, bearing deflectably outwardly against said valve member and sliding thereon to bias said valve member against said valve seat with a force which is a function of the angular position of said rotor in said chamber, the improvement wherein said rotor is a disk in the form of a circular sector extending over about at least 180° and having a peripheral surface and two radial end surfaces, and

stop means extending from said bottom wall of said chamber between said radial end surfaces of said rotor.

4,673,385

PERITONEAL MEMBRANE PLASMAPHERESIS

Robert P. Popovich, 2928 Kassarine Pass, Austin, Tex. 78704, and Jack W. Moncrief, 3633 W. Lake, Austin, Tex. 78746

Continuation of Ser. No. 874,793, Jun. 13, 1986, abandoned, which is a continuation of Ser. No. 817,155, Jan. 7, 1986, abandoned, which is a continuation of Ser. No. 540,010, Oct. 7, 1983, abandoned. This application Dec. 22, 1986, Ser. No. 946,104

Int. Cl.⁴ A61M *1/00*

U.S. Cl. 604—28 **6 Claims**

1. A method of protein removal in the treatment of a patient having a protein mediated disease, comprising the steps of:

infusing plasmate containing a vasoactive drug into the peritoneal cavity;

allowing the plasmate to remian in the peritoneal cavity for a predetermined dwell time period sufficient to effect removal of circulating portein molecules from the blood vascular space of the body of substantially equivalent size and at a substantially equivalent removal rate to the protein removal achieved through extracorporeal plasmapheresis treatment; and

draining the plasmate from the peritoneal cavity.

4,673,386

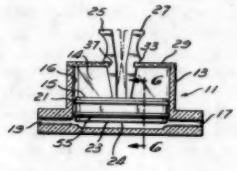
BLOOD SAMPLER DEVICE

Mark G. Gordon, 13182 Woodland Dr., Tustin, Calif. 92680

Filed Mar. 6, 1986, Ser. No. 837,083

Int. Cl.⁴ A61M *5/00*

U.S. Cl. 604—48 **14 Claims**



1. A temporary storage mechanism adapted to facilitate the withdrawal of blood from an injection site through an arterial line comprising:

(a) a storage mechanism housing having inner walls defining an oblong shaped interior chamber;

(b) a first port in fluid communication with said interior chamber, and first port being connectable to a fluid supply for introduction into a patient's bloodstream;

(c) a second port in fluid communication with said chamber, said second port being connectable to the patient injection site;

(d) a retractable piston disposed within said housing, said piston formed in a complementary configuration to said interior chamber and adapted to traverse said chamber; and

(e) a piston sealing member disposed about said piston in slidable sealing engagement with said inner walls of said chamber said piston having a first fixed operative position in said chamber to prevent pressure attenuation within the arterial line and a second operative position wherein said piston is slideably retracted within said chamber to create negative pressure within said chamber, said negative pressure being effective to draw fluid into said chamber through at least one of said ports and temporarily store the same in said chamber for subsequent re-introduction into said injection site.

4,673,387

PELLET INJECTOR

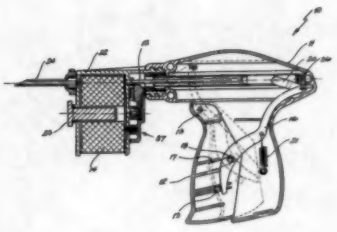
Ian R. Phillips, Killara; Robert H. Lodge, and Glen W. Bunyan, both of Dee Why, all of Australia, assignors to N. J. Phillips Pty. Limited, Dee Why, Australia

Filed Apr. 30, 1986, Ser. No. 858,065

Claims priority, application Australia, May 6, 1985, PH0437

Int. Cl.⁴ A61M *31/00*

U.S. Cl. 604—62 **10 Claims**



1. An injector to dispense pellets from a magazine to be supported by the injector, said magazine having a plurality of spaced pellet receiving parallel passages extending therethrough, said injector comprising a body, an injector rod slidably mounted in said body so as to be movable along a predetermined path from a retracted position to an inject position, said body having a mounting to support said magazine, said mounting being positioned to locate said magazine with one of said passages extending along said path so that said injector rod passes through said magazine so as to move a pellet therefrom to be injected, an operator manipulable trigger mounted on said body and operatively associated with said rod to cause movement thereof along said path, and indexing means actuated by said rod to cause indexing of said magazine, said indexing means including an indexing link movably mounted on said body and movable in a plane generally transverse of said path, said link being positioned to be engaged by said rod and to be moved thereby between a first position with said link projecting into said path and a second position clear of said path, means biassing said link to said first position, and ratchet means connected to said link so as to move therewith, said ratchet means being biassed to engage said magazine to cause indexing thereof when said link is moved from said second position to said first position.

4,673,388

BREAST PUMP

Klaus Schlensog, Cham; Christian Beer, Boniswil, and Robert Riedweg, Lucerne, all of Switzerland, assignors to Ameda AG, Switzerland

Filed Mar. 14, 1985, Ser. No. 711,676

Claims priority, application Switzerland, Mar. 14, 1984, 1268/84

Int. Cl.⁴ A61M *1/06*

U.S. Cl. 604—74 **4 Claims**

1. In a breast pump having:

a suction bell means for contact with a mother's breast, said suction bell means having a longitudinal axis;

a container means for receiving pumped-off milk detachably connected with said suction bell means, said container means having a longitudinal axis that intersects with the

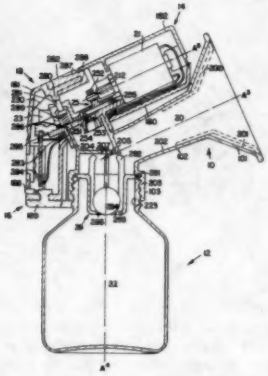
longitudinal axis of said suction bell means at an angle in the range of 90°–150°;

a suction pump means unit for reducing the pressure within said suction bell means, said suction pump means unit including a suction pump, an electric motor driving said suction pump and an electric battery operating said electric motor,

the improvement comprising:

a first elongated housing of said pump means unit having a longitudinal axis substantially parallel to the longitudinal axis of said suction bell means and a second elongated housing having a longitudinal axis substantially parallel to the longitudinal axis of said container means;

said motor being disposed within said first longitudinal housing in axial alignment with the longitudinal axis thereof;



said suction pump also being disposed within said first longitudinal housing and comprising means for imparting a resultant linear oscillatory motion substantially perpendicular to the longitudinal axis of said suction bell means;

said battery being disposed within said second housing, the center of gravity of said breast pump being approximately aligned with the longitudinal axis of said container means; and

valve means arranged intermediate said suction bell means and said container means for closing communication between said suction bell means and said container means operative to maintain reduced pressure within said container means when said suction bell means is temporarily held at atmospheric pressure.

4,673,389

SEQUENCE VALVE FOR PIGGYBACK IV ADMINISTRATION

G. Kent Archibald, White Bear Lake, and Frank A. Slaker, New Brighton, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 29, 1984, Ser. No. 676,020
Int. Cl.[4] A61M *5/14*; F16L *55/14*
U.S. Cl. 604—81 **29 Claims**

18. An IV administraion system comprising:

a first source of a first IV fluid;

a second source of a second IV fluid;

an IV control device having an inlet and an outlet for delivering IV fluids;

a first flexible tube connected between the first source and the inlet;

a second flexible tube connected between the second source and the inlet;

a sequence valve having a first state in which a first flexible tube is occluded and a second flexible tube is not and a second state in which the second tube is occluded and the first tube is not, the sequence valve being manually settable to the first state and switching to the second state in response to a control signal, valve comprising:

a base;

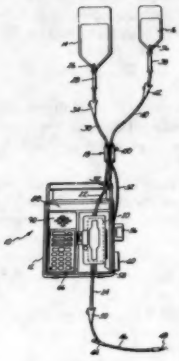
a crank pivotally connected to the base for movement between first and second crank positions;

bias means for providing a bias force to the crank which urges the crank toward the second crank position;

occluder means connected to a first end of the crank for occluding the first flexible tube when the crank is in the first crank position, and for occluding the second flexible tube when the crank is in the second crank position;

manually movable means connected to the crank for moving the crank to the first crank position;

a latch pivotally connected to the base, the latch having an arm and having a latch tooth for engaging a second end of the crank when the crank is moved to the first crank position by the manually movable means;



a solenoid having a plunger which engages the arm of the latch to hold the latch tooth in engagement with the second end of the crank when the crank is in the first crank position, the solenoid being responsive to the control signal to move the plunger out of engagement with the arm to allow rotation of the latch and thereby allow the bias force to rotate the crank from the first crank position to the second crank position, wherein the solenoid is normally deenergized when the sequence valve is in the first state and when the sequence valve is in the second state, and is energized by the control signal to cause a transition from the first to the second state; and

means for providing the control signal to the sequence valve.

4,673,390

MULTIPLE SOLUTION IV SYSTEM

G. Kent Archibald, White Bear Lake, Minn., assignor to Minnesota Mining & Manufacturing Company, St. Paul, Minn.

Filed Nov. 29, 1984, Ser. No. 676,009
Int. Cl.[4] A61M *5/14*
U.S. Cl. 604—81 **6 Claims**

1. An IV administration system comprising:

a first source of a first IV fluid;

a second source of a second IV fluid;

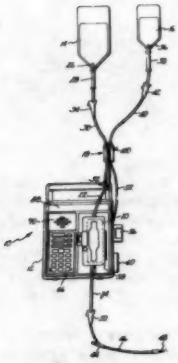
an IV control device having an inlet and an outlet for delivering IV fluids at a rate determined by a rate control signal and having a housing;

a first flexible tube having a first end connected to the first source;

a second flexible tube having a first end connected to the second source;

a connector for connecting second ends of the first and second flexible tubes to the inlet of the IV control device;

valve means positioned between the first and second sources and the connector and having the first and second flexible tubes passing therethrough for controlling fluid flow from the first and second sources to the inlet of the IV control device without contacting the first and second IV fluids, the valve means being manually settable to a first state in which the first tube is pinched off and the second tube is not, and being responsive to a valve control signal to change to a second state in which the second tube is pinched off and the first tube is not wherein the valve means maintains one of the tubes in a pinched off condition at all times; and wherein the valve means is normally deenergized in both its first and second states and is energized in response to the valve control signal to switch from the first to the second state;



means for connecting the outlet of the IV control device to a patient; and

control means located within the housing for providing the rate control signal and the valve control signal to cause the IV control device to deliver the first IV fluid to the patient at a first rate until a first predetermined volume has been delivered and the second IV fluid to the patient at a second rate until a second predetermined volume has been delivered.

4,673,391

NON-CONTACT CONTROLLED MICROPUMP

Tatsuhei Kondo, Nagoya; Kaname Ito, Chita; Shoichiro Ikeda; Masayoshi Umeno, both of Nagoya, and Kenji Ichikawa, Toki, all of Japan, assignors to Koichi Sakurai, Nishikasugai, Japan

Filed May 30, 1984, Ser. No. 615,235

Claims priority, application Japan, May 31, 1983, 58-97327; Jul. 25, 1983, 58-115375[U]

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—141 **12 Claims**

1. A micropump for delivering small quantities of a liquid, comprising:

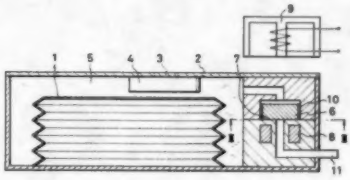
a casing defining a reservoir for containing the liquid,

a first outlet provided in said casing for exhausting the liquid outside the casing,

a bellows disposed in said casing for applying a pressure to the liquid in the reservoir,

a first valve means positioned in said casing downstream of said inlet and electromagnetically controlled for exhausting the liquid outside the casing through said first outlet,

pressure regulating means provided between said first valve means and said reservoir for regulating a pressure of the liquid issued to the first outlet through said first valve means, the pressure regulating means comprising a body having an inlet communicating with the reservoir, a second outlet communicating with the first valve means, a chamber communicating with said second outlet and a passage communicating said chamber with said inlet, a second valve means provided in the passage, a valve seat provided in said passage so as to be brought into contact with a surface of the second valve means and having a central bore for flowing the liquid toward the chamber, a rod movably mounted in the passage so as to open and close the central bore in cooperation with the second valve means to thereby permit and obstruct the flow of the liquid toward the chamber, a diaphragm having an area larger than that of the valve seat, mounted in the chamber so as to divide the chamber into a first chamber and a second chamber communicating with the passage



and the second outlet and connected to the rod, and an elastic-force generating means disposed within the body, said elastic-force generating means generating an elastic force so that said rod is moved toward the second valve means to thereby release a contact of the second valve means with the valve seat to allow the liquid flow into the second chamber through said central bore in the case where a pressure exerted on the diaphragm in the second chamber becomes less than a predetermined pressure and so that said rod is moved toward the diaphragm to thereby keep the contact of the second valve means with the valve seat to obstruct a flow of the liquid through said central bore in the case where the pressure exerted on the diaphragm in the second chamber becomes larger than the predetermined pressure.

4,673,392

PORTABLE SELF-CONTAINED INJECTOR FOR PERFUSIONS, PARTICULARLY IN THE CASE OF ROAD ACCIDENT VICTIMS

Bernard M. Keime, 26, Rue des Begonias, 54000 Nancy, France

Filed Oct. 2, 1985, Ser. No. 783,200

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—141 **5 Claims**

1. A self-contained portable injector for perfusing a liquid into the body of a patient, and adapted to be carried by the patient, comprising in combination

a transparent enclosure,

a divider subdividing said enclosure into a first chamber having an open side, and into a second chamber,

said enclosure including

a U-shaped envelope formed with two legs and a center member joining said legs, an L-shaped bracket fitting the interior of said U-shaped envelope, a shorter arm of said L-shaped bracket having a length smaller than the length of each leg of said U-shaped envelope, thereby creating said first chamber with said open side,

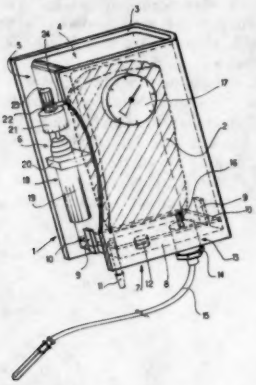
pressure-exerting means disposed in said first chamber and communicating with said second chamber for creating a controllable gas pressure in said second enclosure,

cross-member means secured to said enclosure, said pressure-exerting means being mounted on said cross-member means,

a flexible pouch disposed in said second enclosure and

adapted to contain said liquid, said gas pressure acting on said flexible pouch,

at least one outlet nozzle commnicating with said flexible



pouch, and being adapted to inject said fluid into the patient, and

flexible conduit means connected to said outlet nozzle and adapted to attach said enclosure to the patient.

4,673,393

MEDICAL INSTRUMENT

Tatsuo Suzuki, Machida, and Atsushi Matsumoto, Fuji, both of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

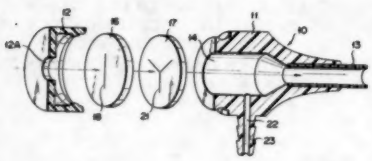
Filed Dec. 24, 1985, Ser. No. 813,025

Claims priority, application Japan, Dec. 28, 1984, 59-281077

The portion of the term of this patent subsequent to Sep. 9, 2003, has been disclaimed.

Int. Cl.[4] A61M *25/00*

U.S. Cl. 604—167 **10 Claims**



1. A medical instrument comprising a main body, in which a path for receiving a bar-like member is formed and a valve mounted on said main body and closing said path, the valve has two end faces in the path direction and having a slit for receiving said bar-like member and, maintaining at least a liquid-tight seal with said bar-like member being passed therethrough, and for closing said path at least in a liquid-tight state when said bar-like member is absent from said path, said valve being made of a flexible and elastic material, wherein said valve comprises a first valve, having a first slit open only to one end face of said valve and a second slit open only to the other end face thereof, said first and second slits extending only partly through said first valve and crossing each other inside said first valve to connect with each other at their intersection, and a second valve, in parallel and contacting to said first valve and having a slit extending through and open to two end faces of said second valve.

4,673,394

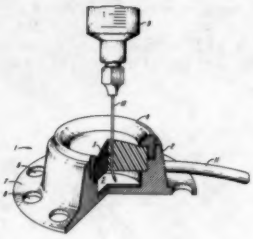
IMPLANTABLE TREATMENT RESERVOIR

Paul V. Fenton, Jr., Marblehead, and Thomas M. Young, North Andover, both of Mass., assignors to Strato Medical Corporation, Beverly, Mass.

Filed Jan. 17, 1986, Ser. No. 820,714

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—175 **12 Claims**



1. A vascular access port for surgical implantation in the body of a mammal, such access port comprising:

a body portion formed of biocompatible material and defining a chamber with an open face,

cover means for closing the chamber thereby forming a closed reservoir for receiving treatment material, said cover means being formed of a self-resealing penetrable polymer,

said body portion having formed therein an access aperture communicating with the closed reservoir, and also having lock means formed adjacent to the aperture for releasably engaging a flange of a mating twist-lockable connection, said lock means including a region of the bounding surface of said body portion, said region defining a void region adjacent to said aperture exterior to said reservoir and including means for releasably engaging said flange by a partial revolution of such connection, whereby the reservoir may be placed in fluid communication with a catheter having such a mating twist-lockable connection.

4,673,395

DUAL BARREL INJECTOR

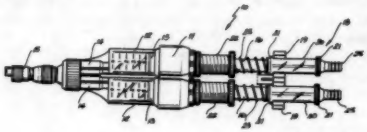
Ian R. Phillips, Killara, Australia, assignor to N.J. Phillips Pty. Limited, New South Wales, Australia

Filed Mar. 24, 1986, Ser. No. 843,090

Claims priority, application Australia, Mar. 26, 1985, PG9903

Int. Cl.[4] A61M *5/08*

U.S. Cl. 604—191 **10 Claims**



1. A multi dose injector for injecting liquids, comprising a body, a plurality of cylinders mounted on the body and each having an associated piston, with each cylinder and its associated piston co-operating to define a variable volume working space, an outlet passage extending from each space enabling the passage of liquid therefrom upon relative movement between each cylinder and its associated piston to decrease the volume of the space defined thereby, an inlet passage extending to each space enabling the delivery of liquid to each space upon relative movement between each piston and its associated cylinder to increase the volume of the space defined thereby, operator manipulable means to cause simultaneous relative

movement between each cylinder and its associated piston to vary the volume of the spaces defined thereby, value means restricting the liquid to pass from the inlet passages to the outlet passages during operation of the injector, and wherein said outlet passages extend to a common outlet so that upon the simultaneous decrease in volume of the spaces, the liquids contained therein are simultaneously moved through said common outlet.

4,673,396

SYRINGE CARTRIDGE

Ray Urbaniak, 1400 NW. 4th Ct., Boca Raton, Fla. 33432

PCT No. PCT/US83/01688, § 371 Date Jun. 13, 1984, § 102(e) Date Jul. 22, 1984, PCT Pub. No. WO84/02079, PCT Pub. Date Jun. 7, 1984

PCT Filed Oct. 27, 1983, Ser. No. 648,234

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—211 **2 Claims**

1. A syringe comprising, in combination:
- a cylindrical cartridge having two open ends,
- a movable plunger means for closing one end of the cartridge,
- a first closure means for the other end of the cartridge for displacement of product within the cartridge to achieve a predetermined head space therein,
- a second closure means removably secured to said first closure means,
- said second closure means having reseal means interacting with said first closure means to reseal with predetermined head space by displacing a portion of product in the first closure means,
- a screw plunger adapter applied at the lower portion of the cartridge, and
- a metering screw plunger adapted to engage the screw plunger adapter,

whereby the technician may rotate the threaded metering screw plunger to advance the movable plunger means and, with precision, meter the contents for removal through the hollow bore of the needle.

4,673,397

SPLASH BACK REDUCTION DRIP CHAMBER

Kenneth M. Lynn, Spring Grove, and Richard Rollins, Mundelein, both of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation of Ser. No. 763,302, Aug. 2, 1985, abandoned, which is a continuation of Ser. No. 512,796, Jul. 11, 1983. This application Oct. 29, 1986, Ser. No. 926,802

Int. Cl.[4] A61M *5/16*

U.S. Cl. 604—251 **16 Claims**

1. A drip chamber defining a flexible plastic chamber having an interior surface, an inlet for communicating with drop former, and an outlet, the improvement comprising:
- splash back reduction means for reducing splash back of droplets in said chamber, said means including an irregular finish on at least a portion of said interior surface substantially adjacent an anticipated liquid surface level in said chamber, said irregular finish having peaks and valleys ranging from about 140 to 240 microns width, the

heights from peaks to valleys ranging from about 140 to 240 microns.

4,673,398

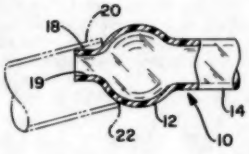
SUCTION DEVICE FOR USE WITH TRACHEOSTOMY TUBE

Kenneth R. Turner, 36 Orchard Rd., Akron, Ohio 44313, and James A. Ashe, P.O. Box 619, Geneva, Ohio 44041

Filed Dec. 16, 1985, Ser. No. 809,292

Int. Cl.[4] B65B *3/04*

U.S. Cl. 604—264 **12 Claims**



1. A suction device adapted to be inserted into the end of a tracheostomy tube which is outside the patient's body for removing matter from the upper respiratory tract of said patient, said suction device being inflexible, essentially tubular and open at both ends and comprising:
- a hollow spherical bulb near one end thereof, said bulb having an outside diameter larger than that of said tracheostomy tube;
- a tubular portion of appreciable axial length extending from said bulb and having an opening at its outer end, the diameter of said tubular portion being substantially less than the diameter of said bulb, and
- a hollow projection extending from said bulb in a direction opposite to that of said tubular portion and having an opening at its outer end, said last-mentioned opening being smaller in diameter than the opening at the outer end of said tubular portion, the outside diameter of said hollow projection being less than the inside diameter of said open end of said tracheostomy tube,
- the bulbous end of said suction device being adapted for insertion into the end of the tracheostomy tube which is outside the patient's body so that said bulb is against the end of said tube and said projection is in communication with said tube,
- the axial length of said projection being substantially less than the diameter of said hollow spherical bulb, so that said suction device can be inserted with the axes of the suction device and the tracheostomy tube at an angle with respect to each other,
- the outer end of said tubular portion being adapted to be attached to a source of vacuum.

4,673,399
DISPOSABLE INJECTION TRANSMITTER

Earl M. Pruett, St. Louis, Mo., assignor to Enrico Bertucci, Belleville, Ill., a part interest

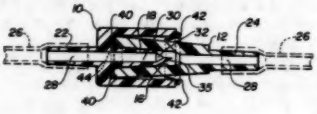
Filed Jun. 6, 1985, Ser. No. 741,842
Int. Cl.[4] A61M 5/16, 27/00
U.S. Cl. 604—272 16 Claims

1. A disposqble injection transmitter for substantially reducing the number of punctures of the membrane of a primary injection site by receiving multiple needle punctures for fluid injections while introducing a single needle puncture of the primary injection site membrane comprising a body having a fluid passage through it, a hollow auxiliary needle connected to the body at one end of and in communication with the fluid passage, an elastomeric wall permanently connected to the body and positioned to close the other end of the passage, the wall completely closing the body except for the communication with the fluid passage through the auxiliary needle, the wall adapted to receive fluid injecting syringe needles successively through it while the wall remains connected to the body, the wall having a face generally normal to the fluid passage so that an injection needle stuck through the wall will enter the fluid passage.

4,673,400
ASEPTIC CONNECTOR ASSEMBLY FOR CONDUITS FOR STERILE FLUIDS

Ivan W. Martin, R.D. 4—Box 156A, Denver, Pa. 17517

Filed Feb. 10, 1986, Ser. No. 827,459
Int. Cl.[4] A61M 3/00
U.S. Cl. 604—283 6 Claims

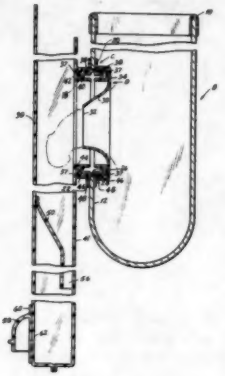


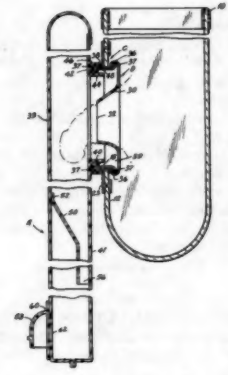
1. An aseptic connector assembly for connecting conductors for sterile fluids comprising in combination, axially extending complementary male and female connector members each having tubular means integral therewith at one end and connectable to a conductor, the female member also having an axial socket on the opposite end, opening outwardly and dimensioned to slidably receive said male member longitudinally, the male member also having a tapered axial socket on the opposite end thereof opening outward and communicating with the tubular means on said one end thereof, the socket of said female member also having an axially-extending prong integral therewith and terminating in a piercing point spaced inwardly from the plane of the open end of the socket and being tapered in complement to the taper of the socket of said male member and adapted to frictionally engage said socket when inserted thereinto, and sterile sealing membranes aseptically and respectively affixed over the outer ends of both of said sockets; said sterile membranes and the outer ends of the sockets to which they are connected being adapted to be firmly abutted and the male member inserted within the female member initially to pierce the sterile membrane affixed over the face of the socket in the female member and followed by said piercing prong puncturing the membrane affixed over the face of the socket in said male member and finally frictionally engage said piercing prong within the tapered socket in said male member to establish a sterile fluid passage through the connected members.

4,673,401
MALE INCONTINENCE DEVICE

Ole R. Jensen, 646 Orangeburg Rd., River Vale, N.J. 07675, and Keith T. Ferguson, 231 Katherine St., Scotch Plains, N.J. 07076

Filed Apr. 2, 1984, Ser. No. 595,827
Int. Cl.[4] A61F 5/44
U.S. Cl. 604—353 21 Claims





1. A male incontinence device comprising an undergarment in the form of a brief, a flexible liquid collection receptacle, and means for releasably mounting said receptacle to said brief, said mounting means comprising first and second substantially rigid annular parts affixed to said brief and said receptacle, respectively, and means for releasably interengaging said first and second parts in a load bearing manner to support the weight of said receptacle, said brief comprising an opening adapted to be aligned with the penis, said brief opening being defined by said first part, said receptacle comprising an elongated, hollow member having an opening therein defined by

said second part, said first and second parts having internal diameters substantially larger than the diameter of the penis to permit the penis to be freely received therethrough in a non-load-bearing manner, a flexible membrane adapted to be situated proximate said brief opening and having an expandable opening adapted to receive and lightly sealingly engage the penis, means for mounting said membrane to said brief, said means for mounting said membrane to said brief comprising a third substantially rigid annular part affixed to said brief, said first and third parts being mounted on opposite surfaces of said brief.

4,673,402

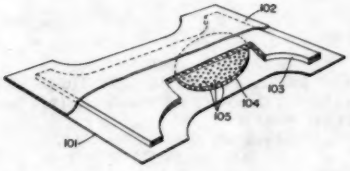
ABSORBENT ARTICLES WITH DUAL-LAYERED CORES

Paul T. Weisman; Dawn I. Houghton, both of Fairfield, Ohio, and Dale A. Gellert, Aurora, Ind., assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 734,426, May 15, 1985, abandoned. This application Aug. 11, 1986, Ser. No. 895,526

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—368 **21 Claims**



1. A disposable absorbent article comprising:
(A) a liquid impervious, elongated backing sheet;
(B) a relatively hydrophobic, liquid pervious topsheet; and
(C) a layered absorbent core positioned between said backing sheet and said topsheet, said core comprising:
(i) an upper fluid acquisition/distribution layer having a density of from about 0.05 to 0.25 g/cm^3 and consisting essentially of hydrophilic fiber material and from 0% to about 8% by weight of said upper layer of particles of substantially water-in-soluble hydrogel material; and
(ii) a lower fluid storage layer having a density of from about 0.06 to 0.3 g/cm^3 and consisting essentially of a substantially uniform combination of hydrophilic fiber material and from about 9% to 60% by weight of said lower layer of particles of substantially water-insoluble hydrogel material;
said lower fluid storage layer having a top surface area which is from about 0.25 to 1.0 times that of said upper fluid acquisition/distribution layer and said lower fluid storage layer further being positioned relative to said backing sheet and said upper layer in a manner such that at least about 75% of the hydrogel material in said lower layer is found within the front two-thirds section of said absorbent article and such that at least about 55% of the hydrogel material in said lower layer is found within the front half section of said absorbent article.

4,673,403

METHOD AND PAD ALLOWING IMPROVED PLACEMENT OF CATAMENIAL DEVICE

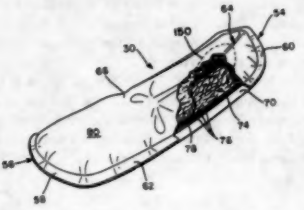
Frederich O. Lassen, Neenah; Earle H. Sherrod; Ann M. Nichols, both of Appleton, and Paul J. Serbiak, Green Bay, all of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Oct. 30, 1985, Ser. No. 792,730

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—385 R **29 Claims**

1. A device for absorption of body exudate comprising an absorbent pad, a liquid permeable body side member, a liquid impermeable backing member and said absorbent therebetween wherein there is provided on the body side of said device a flow zone indicator means for connoting accurate placement of said pad onto the wearer's body in the region



where greatest exudate flow will contact the flow zone indicator such that the wearer of said pad is able to adjust placement of said pad to locate it in the area of greatest exudate flow.

4,673,404

PRESSURE BALANCING DEVICE FOR SEALED VESSELS

Bengt Gustavsson, Bergsbogatan 29, S-421 79 Västra Frölunda, Sweden

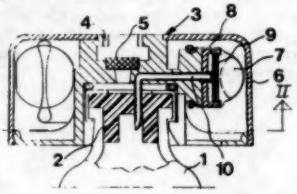
PCT No. PCT/SE84/00195, § 371 Date Jan. 17, 1985, § 102(e) Date Jan. 17, 1985, PCT Pub. No. WO84/04672, PCT Pub. Date Dec. 6, 1984

PCT Filed May 21, 1984, Ser. No. 700,699

Claims priority, application Sweden, May 20, 1983, 8301176; Mar. 2, 1984, PCT/SE84/00075

Int. Cl.[4] A61B *19/00;* **A61M** *5/32*

U.S. Cl. 604—411 **8 Claims**



1. In combination with a vessel having a neck fitted with a closure member through which a needle can be passed for entering the interior of the vessel for removing or adding material thereto: a device for ventilating and pressure balancing the interior of the vessel comprising a cap fitted and sealed to the neck of the container and overlying the closure member, said cap including an internal passage adapted to be in communication with the interior of the vessel when the closure is punctured and a closed expandable and contractable container in communication with said internal passage.

4,673,405

OSMOTIC SYSTEM WITH INSTANT DRUG AVAILABILITY

George V. Guittard, Cupertino; Joseph C. Deters, Mountain View; Felix Theeuwes, Los Altos, and Richard Cortese, San Jose, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Continuation of Ser. No. 472,333, Mar. 4, 1983, Pat. No. 4,576,604. This application Jan. 8, 1986, Ser. No. 817,211

The portion of the term of this patent subsequent to Mar. 18, 2003, has been disclaimed.

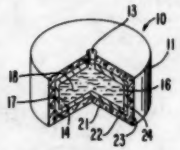
Int. Cl.[4] A61M *31/00*

U.S. Cl. 604—890 **4 Claims**

1. An osmotic device for delivering a beneficial agent to a fluid environment of use, the osmotic device comprising:

(a) a wall at least in part comprising a substantially inert composition which surrounds and forms a compartment containing a beneficial agent formulation, said substantially inert composition being permeable to the passage of an exterior fluid present in the environment of use and substantially impermeable to the passage of the beneficial agent in the compartment;

(b) a beneficial agent in the wall, said agent being selected from the group of beneficial agents that act on at least one of peripheral nerves, adrenergic receptors, cholinergic receptors, skeletal muscles, smooth muscles, cardiovascular system, blood circulatory system, synoptic sites, neuro-



effector sites, endocrine system, hormone system, immunological system, reproductive system, skeletal system, autocoid system, alimentary system and excretory system and being released from the wall when the osmotic device is in operation in the fluid environment of use; and

(c) at least one passageway in the wall which is formed when the device is in the fluid environment of use and the fluid contacts and thus releases the beneficial agent in the wall, said formed passageway communicating with the compartment and the exterior of the device for dispensing the beneficial agent from the compartment when the device is in the fluid environment of use.

4,673,406

ONE-PIECE IMPLANTATION LENS

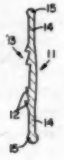
Hans-Joachim Schlegel, Bad Homburg, Fed. Rep. of Germany, assignor to Inprohold Establishment, Vaduz, Liechtenstein

Filed Oct. 28, 1985, Ser. No. 792,114

Claims priority, application Fed. Rep. of Germany, Oct. 29, 1984, 3439551

Int. Cl.[4] A61F 2/16

U.S. Cl. 623—6 **16 Claims**



1. A one-piece implantation lens for use as a replacement for a natural lens which has been surgically, in particular extracapsularly, removed from the eye of a living being of a higher order, comprising

(a) a central lens body consisting of a homogenous, crystal-clear flexible plastic material with a specific gravity of between 1.01 and 1.08 and resistant to high temperatures, said lens body being delimited, as considered in the implanted position of the lens, by respective front and back major surfaces at least one of which has a configuration of a Fresnel lens having a circular central portion and at least one annular portion immediately surrounding said central portion,

said central portion being offset from said annular portion into said lens body to reduce the thickness of said lens body and facilitate folding thereof during the implantation of the lens into the eye, and

said major surfaces being so configured that said lens body has light-collecting properties and the light passing through both said central portion and said annular portion is focused into the same focal point, and

(b) holding means including thinwalled, flat supporting elements arranged on the periphery of said lens body and extending radially outwardly therefrom for fixing said lens body in place upon implantation,

said holding means having an outer edge lying on a circular arc around the middle point of said lens body.

4,673,407

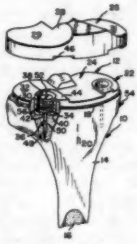
JOINT-REPLACEMENT PROSTHETIC DEVICE

Daniel L. Martin, One St. Francis Place, Apt. 1107, San Francisco, Calif. 94107

Filed Feb. 20, 1985, Ser. No. 704,622

Int. Cl.[4] A61F 2/38

U.S. Cl. 623—20 **6 Claims**



1. A prosthetic device for use in joint replacement in a bone, comprising, when operatively assembled.

an implant defining an interface surface adapted to seat on a receiving surface of the bone,

an attachment element adapted to be secured to a portion of the bone which is spaced from such interface by an axially extending bone region,

a connecting member, connecting the implant to the attachment element, adapted to allow substantially unhindered axial, lateral, rotational, and twisting movement of the implant relative to the attachment member, to produce substantially physiological loading of such bone region in response to compressional, shear, rotational and twisting forces, respectively, which are applied to the implant, and

a spring (i) having a spring rate which is low in comparison to the spring rate of the bone region spanned by the connecting member, and (ii) operatively interposed between the implant and the attachment element, for biasing the implant against such surface with a selected compression force that is directed substantially parallel to the principal force application to the joint, and which exerts substantially no shear force on the implant,

wherein said attachment element is a plug adapted for anchoring to such bone portion, and the spring element is contained in the plug.

4,673,408

KNEE PROSTHESIS

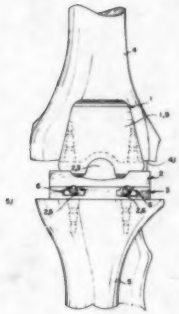
Charl J. Grobbelaar, Pretoria, South Africa, assignor to Arthroplasty Research & Development (Pty) Ltd., Pretoria, South Africa

Filed Aug. 1, 1984, Ser. No. 636,685

Claims priority, application South Africa, Aug. 24, 1983, 83-2059

Int. Cl.[4] B61F *2/38*

U.S. Cl. 623—20 4 Claims



1. A knee prosthesis which comprises a femoral component and a tibial component, for use in a procedure involving removal of the cruciate ligaments, each component extending across the width of the joint, the femoral component presenting a pair of bearing convexities separated by a groove and curving posteriorly and upwardly for flexion, the tibial component comprising a coacting pair of bearing concavities separated by a dome, and presented as a bearing pad or pads supported on a base, the skeleto-prosthetic interface of each component presenting one or more keying element(s) adapted to penetrate the bone, said femoral component having a posterior portion, a groove formed in the posterior portion and intersecting an opening which separates the two bearing convexities in the posterior portion, the bearing convexities each having surfaces which, in transverse vertical planes are flat and inclined to the horizontal at an angle of between 0° and 30° and in which the anterior portion presents a high polished and somewhat hollowed surface which leads into the groove as a bearing surface for the patella, said keying elements being narrow and deep with their short dimensions extending transversely in the joint and their longer dimensions extending posteriorly and anteriorly in the joint, said tibial component comprising a bearing pad locked in an adjustable position on a base, the base carrying the keying elements and supporting the pad, the base having undercut keyways or grooves into which matching formations of the bearing pad can be slid so as to key the pad onto the base, and including screw means engaging said bearing pad and said base to lock the bearing pad in position in such keyways or grooves to provide security of placement of the pad.

4,673,409

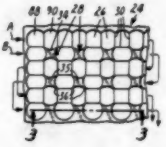
IMPLANT WITH ATTACHMENT SURFACE

Craig L. Van Kampen, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 603,777, Apr. 25, 1984, Pat. No. 4,608,052. This application Mar. 27, 1986, Ser. No. 844,874

Int. Cl.[4] A61F *2/36;* B23K *9/00*

U.S. Cl. 623—23 8 Claims



1. A method of forming an attachment surface on an implant for use in a human body, said method comprising the steps of:

a. directing a pulsating beam of laser energy towards a surface of the implant;

b. focusing said beam of laser energy at a distance below said surface of said implant;

c. moving said beam of laser energy relative to said surface in a first direction at a first speed to drill a first multiplicity of generally cylindrical bores having a diameter in the range of about 50–400 microns with adjacent bores having center-to-center spacings less than the sum of the radiuses of said adjacent bores, so that the rims of said adjacent bores intersect below said surface of said implant; and

d. moving said beam of laser energy relative to said surface in a second direction generally parallel to said first direction at a second speed greater than said first speed to drill a second multiplicity of generally cylindrical bores in said surface, each of said bores having a diameter in the range of about 50–400 microns with adjacent bores having center-to-center spacings greater than the sum of the radiuses of said adjacent bores, said second direction being perpendicularly spaced from said first direction less than the sum of the radiuses of one of said bores of said first multiplicity and one of said bores of said second multiplicity, so that the rims of said ones of said bores intersect below said surface of said implant to define an inner attachment surface within said implant and a multiplicity of spaced posts projecting from said inner attachment surface portion.

4,673,410

ANIONIC DYE DISPERSIONS WITH ENHANCED COLD WATER SOLUBILITY UPON DILUTION

Charles W. Sandefur, and Thomas J. Thomas, both of Summerville, S.C., assignors to Mobay Corporation, Pittsburgh, Pa.

Filed Nov. 19, 1985, Ser. No. 799,672
Int. Cl.[4] C09B 67/00
U.S. Cl. 8—528 15 Claims

1. A non-sedimenting, stable concentrated aqueous dye dispersion having superior cold water solubility comprising

(a) between about 10 and 60 weight percent of a water-soluble dyestuff with at least one anionic water solubilizing group and with an average particle size of between about 1 and 5 microns,

(b) a sufficient amount of a lithium or ammonium salt of a chelating agent to give the dispersion a three-minute visual solubility in 25° C. distilled water of at least about 5 grams per liter, and

(c) sufficient water to give the dispersion a room temperature viscosity of less than about 4000 cps measured with a Brookfield viscometer at 12 rpm, said dispersion having a pH of greater than about 5.

4,673,411

ANTI-GEL FUEL COMPOSITION

Otis L. Nelson, Jr., and Mark L. Nelson, both of Bay City, Mich., assignors to Polar Molecular Corporation, Saginaw, Mich.

Continuation of Ser. No. 569,441, Jan. 9, 1984, abandoned. This application Aug. 28, 1986, Ser. No. 901,015
Int. Cl.[4] C10L 1/02
U.S. Cl. 44—53 19 Claims

1. An antigel composition comprising

(a) 10–70 wgt % of a polar, oxygenated, long chain hydrocarbon having an acid number from about 25 to about 125;

(b) 5–50 wgt % of a glycol ether hydrophilic precipitant;

(c) 5–60 wgt % of a low molecular weight addition copolymer; and

(d) 5–30 wgt % of an alcoholic compatibilizing agent;

whereby the composition prevents wax plugging of a 10-micron fuel filter at about −17° F.

4,673,412

FUEL ADDITIVE COMPRISING A METAL COMPOUND AND AN OXIME AND FUEL COMPOSITIONS CONTAINING SAME

Stephen H. Stoldt, Concord Township, Lake County, and Reed H. Walsh, Mentor, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Filed Sep. 24, 1985, Ser. No. 779,749
Int. Cl.[4] C10L 1/18
U.S. Cl. 44—68 25 Claims

1. A composition comprising:

(I) an oil-soluble, transition metal complex of a Mannich base, and

(II) an oxime wherein the molar ratio of I:II is from about 1:10 to about 10:1.

4,673,413

APPARATUS FOR GASIFYING WASTE OIL

William A. Strong, 394 Graham Rd., South Windsor, Conn. 06074

Filed May 6, 1985, Ser. No. 730,453
Int. Cl.[4] C10G 9/04
U.S. Cl. 48—105 7 Claims

1. An apparatus operating at relatively low pressure ranging between 5 to 35 psi for effecting the gasification of an organic carbonaceous material comprising;

a furnace for effecting the generation of combustion gases, said furnace having a primary heating chamber and a secondary heating chamber,

burner means for firing said furnace,

a primary dynamic mixer disposed in said primary heating chamber of said furnace,

a secondary dynamic mixer serially connected to said primary dynamic mixer,

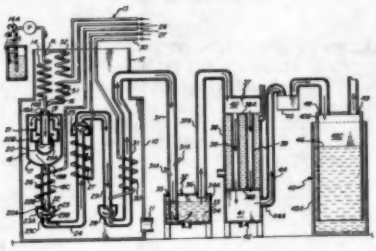
supply means for introducing an organic carbonaceous material to be gasified into said primary dynamic mixer,

said supply means including a coil disposed in said secondary heating chamber for effecting a preheating of said carbonaceous material flowing therethrough prior to introduction into said primary dynamic mixer,

means for adding steam to said preheated carbonaceous material in advance of said primary dynamic mixer,

means disposed within said primary mixer to define a tortuous path for the material flowing therethrough, whereby said material is mixed with said steam and heated to a temperature ranging between 1600° to 1800° F.,

said primary dynamic mixer having an outlet means,



said secondary dynamic mixer being connected to said outlet means,

a first steam coil disposed in said furnace,

said first steam coil being connected to said outlet means for introducing additional steam to the heated carbonaceous material flowing into said secondary dynamic mixer wherein said heated carbonaceous material is heated to a temperature ranging between 1800° to 2200° F.,

a washer means connected to said secondary dynamic mixer for washing the gases resulting from the heating of the carbonaceous material in said primary and secondary dynamic mixers,

a condensing means connected to said washing means for condensing the moisture out of said gases flowing therethrough,

and a collector for receiving and storing the moisture freed gases.

4,673,414

RE-SINTERED BORON-RICH POLYCRYSTALLINE CUBIC BORON NITRIDE AND METHOD FOR MAKING SAME

Thomas R. Lavens, Sunbury; Francis R. Corrigan, Westerville; Richard L. Shott, Columbus, and Harold P. Bovenkerk, Worthington, all of Ohio, assignors to General Electric Company, Worthington, Ohio

Filed Jan. 29, 1986, Ser. No. 823,893
Int. Cl.[4] B24D 3/00
U.S. Cl. 51—293 14 Claims

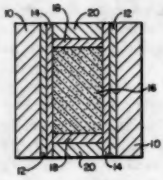
1. A method for making re-sintered polycrystalline cubic boron nitride (CBN) which comprises:

(a) placing sintered substantially catalyst-free boron-rich polycrystalline cubic boron nitride particles in a high pressure/high temperature apparatus, said particles being substantially free of sintering inhibiting impurities;

(b) subjecting said boron-rich cubic boron nitride particles to a pressure and a temperature adequate to re-sinter said particles, the temperature being below the CBN reconversion temperature;

(c) maintaining said temperature and pressure for a time

sufficient to re-sinter the boron-rich cubic boron nitride particles in said apparatus; and



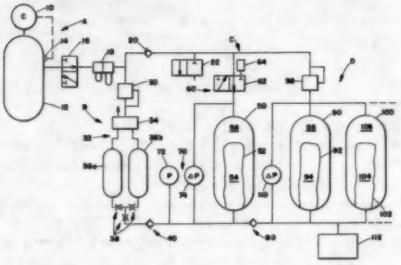
(d) recovering said re-sintered polycrystalline cubic boron nitride from said apparatus.

4,673,415

OXYGEN PRODUCTION SYSTEM WITH TWO STAGE OXYGEN PRESSURIZATION

Raymond A. Stanford, Rock Island, Ill., assignor to VBM Corporation, Louisville, Ky.

Filed May 22, 1986, Ser. No. 865,869
Int. Cl.[4] B01D *53/04*
U.S. Cl. 55—21 **15 Claims**



1. An apparatus for supplying a selected gaseous component, the apparatus comprising:

a separating means for separating the selected gaseous component from a gaseous mixture, the separating means providing the selected gaseous component at a relatively low separated gas pressure;

a first one-way valve means for permitting the separated gaseous component to flow from the separating means to a first pressurizing means and for inhibiting the flow from the first pressurizing means to the separating means;

the first pressurizing means cyclically receives the selected gaseous component at the relatively low separated gas pressure and increases the pressure of the received selected gaseous component with a first preselected pressure;

a second one-way valve means for permitting the separated, pressurized gaseous component to flow from the first pressurizing means to a second pressurizing means and blocking the flow from the second pressurizing means to the first pressurizing means;

the second pressurizing means (i) continuously pressurizes the received, selected gaseous component, (ii) to a preselected second pressure, which second preselected pressure is less than the first preselected pressure.

11. A method of supplying a selected gaseous component, the method comprising:

separating the selected gaseous component from a gaseous mixture, the separated gaseous component being at a relatively low separated gas pressure;

in a first tank cyclically (i) receiving the separated gaseous component at the relatively low separated gas pressure and (ii) increasing the pressure of the received separated gas with a first preselected pressure;

transferring the pressurized separated gaseous component to a second tank;

continuously pressurizing the gaseous component in the second tank to a second preselected pressure, which second preselected pressure is lower than the first pressure; and,

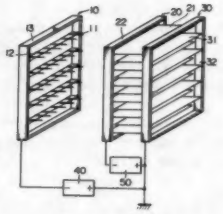
selectively supplying the gaseous component from the second tank at the second pressure.

4,673,416

AIR CLEANING APPARATUS

Nobuyoshi Sakakibara, Hekinan; Tadashi Hattori, Okazaki; Kazuhiko Miura, Aichi; Hiroki Noguchi, Nishio; Akira Fukami, and Telichi Nabeta, both of Okazaki, all of Japan, assignors to Nippondenso Co., Ltd. and Nippon Soken, Inc., both of Nishio, Japan

Continuation of Ser. No. 678,159, Dec. 4, 1984, abandoned. This application Jun. 12, 1986, Ser. No. 874,820
Claims priority, application Japan, Dec. 5, 1983, 58-230393
Int. Cl.[4] B03C *3/12*
U.S. Cl. 55—137 **4 Claims**



1. An ion wind air cleaning apparatus comprising:

a housing having an air suction opening and an air exhaust opening to create a wind therethrough;

a plurality of electrical discharge electrodes arranged in said housing adjacent said suction opening;

a plurality of electrical field forming electrodes arranged in said housing downwind of and spaced from said electrical discharge electrodes to form a discharge gap therebetween, said electrical field forming electrodes being arranged in parallel with the flow of charged particles;

a plurality of dust collecting electrodes arranged between and in parallel with said electrical field forming electrodes;

high voltage means for establishing a potential difference between said electrical discharge electrodes and said dust collecting electrodes to create an ion wind and for establishing a potential difference between said electrical field forming electrodes and said dust collecting electrodes;

a terminal of one polarity of said high voltage means being connected with said electrical discharge electrodes and said field forming electrodes;

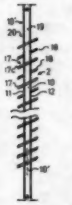
the terminal of the other polarity of said high voltage means being connected with said dust collecting electrodes, either of said field forming electrodes or said dust collecting electrodes being negatively charged; and

an insulator member covering the entire surface either of said dust collecting electrodes and said field forming electrodes of which the polarity connection is negative.

4,673,417
RIGID DISCHARGE ELECTRODE

Rolf Göransson, and Henrik Stomberg, both of Växjö, Sweden, assignors to Fläkt AB, Nacka, Sweden

Filed Nov. 4, 1985, Ser. No. 794,534
Claims priority, application Sweden, Nov. 5, 1984, 8405540
Int. Cl.[4] B03C 3/04, 3/41
U.S. Cl. 55—148 21 Claims



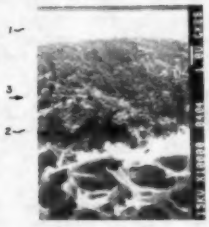
1. A rigid discharge electrode, comprising:
a rod-like member having at least two mutually opposite and mutually parallel surfaces;
two stacking surfaces interconnecting the two mutually opposite and mutually parallel surfaces;
a plurality of electrode parts attached to the opposite surfaces, said electrode parts extending along said surfaces and transversely to the longitudinal axis of the rod-like member;
each electrode part having a discharge tip projecting beyond the outer defining surfaces of the rod-like member;
wherein the electrode parts are inclined on the rod-like member relative to a center line thereon to allow one of the stacking surfaces of one rigid discharge electrode to lie flush against a stacking surface of an adjacent rigid discharge electrode;
one end of one of said opposite surfaces is arranged to face towards a holder for the rigid discharge electrode;
a securing means, effective to produce a clamping action, extends through both of said opposite surfaces, a first end part of the securing means rests against the holder;
a clamping device coacting with a second end part of the securing means to clamp the rod-like member to the holder; and
a sleeve arranged on the securing means, said sleeve passing through the one opposite surface and abutting the other opposite surface.

4,673,418
METHOD FOR PRODUCING AN INTEGRAL, ASYMMETRIC MEMBRANE AND THE RESULTANT MEMBRANE

Klaus-Viktor Peinemann, Lauenburg, Fed. Rep. of Germany, assignor to GKSS Forschungszentrum GmbH, Geesthacht, Fed. Rep. of Germany

Filed May 31, 1985, Ser. No. 739,873
Claims priority, application Fed. Rep. of Germany, Jun. 1, 1984, 3420373
Int. Cl.[4] B01D 53/22, 13/04; C08J 9/28
U.S. Cl. 55—158 13 Claims

1. A method for producing integral, asymetrical membranes for separating gases in mixtures comprising:
mixing together a polyether imide membrane forming polymer which forms membranes that are permeable to at least one gas in a mixture of gases, a volatile solvent for the polymer having a lower boiling point than any other component in the mixture, and an organic liquid swelling agent in which the polymer is not soluble and which does not react with either the polymer or the solvent to form a pourable liquid mixture, pore-free membranes that are permeable to at least one gas in the mixture of gases, the solvent is selected to have a lower boiling point than the other components in the mixture, and the swelling agent is selected to be an organic liquid in which the polymer is not soluble and which does not react with the polymer or the solvent;
spreading said liquid mixture to form a thin film;
exposing said film to air or an inert gas to form a surface skin by evaporation, and



contacting said film with a precipitation agent to form an integral, asymmetric polyether imide membrane.

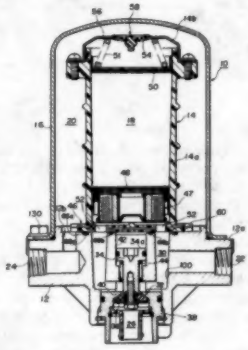
3. The method of claim 1, wherein the surface skin of the membrane is covered with an elastomer.

12. A membrane produced according to the method of claim 1.

4,673,419
AIR DRYER DEVICE

Katsumi Kojima, Yokosuka, Japan, assignor to Nippon Air Brake Co., Ltd., Japan

Filed Aug. 21, 1986, Ser. No. 899,070
Claims priority, application Japan, Sep. 5, 1985, 60-135938[U]
Int. Cl.[4] B01D 53/04
U.S. Cl. 55—163 6 Claims



1. An air dryer device for drying compressed air which comprises:
(a) a base member having an upper surface, an air inlet connectable to a source of compressed air, an air outlet connectable to an air tank, and a cavity communicating with said air inlet and having an upper end opening to said upper surface;
(b) a housing mounted on said base member at a lower end thereof;
(c) a drain passage provided in said base member and communicating to the ambient atmosphere;
(d) a drain valve mounted on said base member for selectively communicating said cavity with said drain passage;
(e) an air dryer disposed within said housing, said air dryer

including an absorbent container of a synthetic resin holding an absorbent material and disposed in spaced relation to said housing to form a space therebetween which communicates with said air outlet of said base member, said container having a lower end wall seated on said upper surface of said base member to close said open upper end of said cavity, said container having a peripheral flange at a lower end thereof, said lower end wall and said flange defining a bottom of said container, said container having an air passage for communicating the interior of said container with said space, said container being provided with a check valve mounted in said air passage for allowing a flow of the air from the interior of said container to said space but preventing a flow of the air from said space to the interior of said container, and said container having a throttle passage for allowing the air to flow from said space to the interior of said container to regenerate the absorbent material therein;

(f) a plate embedded in said bottom of said container, another air passage being formed through said bottom to communicate said cavity with the interior of said container,

(g) fastening elements passing through said flange and said plate into said base member to fasten said container to said base member.

4,673,420

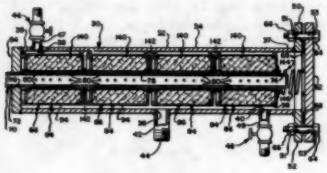
DESICCANT DRYER

Leroy C. Haker, 1091 Rice Rd., Elma, N.Y. 14059, and William Kitto, 4900 W. St. Charles St., Lake Charles, La. 70605

Filed Feb. 10, 1986, Ser. No. 827,404

Int. Cl.[4] B01D *53/04*

U.S. Cl. 55—179 **22 Claims**



1. A desiccant dryer comprising:

canister means defining an annular cavity for desiccant, said cavity having concentrically-arranged and cylindrically-shaped inner and outer walls and two end walls which are positioned at opposite ends of said cavity and which join said inner and outer walls, said inner and outer walls being gas-permeable;

a quantity of desiccant positioned within so as to substantially fill said annular cavity;

means defining a substantially enclosed elongated housing in which said desiccant canister is positioned and including means defining an inlet opening at one end of said housing and an outlet opening for gas entering and leaving said housing, said inlet opening being located generally centrally of said one housing end; and

routing means in the form of a hollow tubular member supportedly attached to said housing at said one end thereof and including a portion which extends axially of said housing through the interior of said cylindrically-shaped inner wall of said cavity means for routing gas from said inlet opening into the interior of said cylindrically-shaped inner wall of said canister means, said extending portion of said tubular member defining apertures disposed therealong and therearound and being closed at an end thereof opposite said one housing end, said canister positioned about said tubular member with the inner wall thereof encircling said extending portion so that gas flowing through said tubular member from said inlet opening is directed radially outwardly through said apertures, said annular cavity and said quantity of desiccant contained therein toward said outlet opening and so that the entire length of the inner wall of said canister means is exposed to gas routed through the housing inlet opening.

4,673,421

FLUE GAS INJECTION DEVICE IN A COOLING TOWER

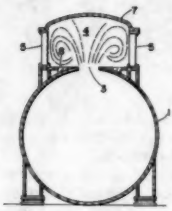
Manfred J. Schwickert, Bochum, Fed. Rep. of Germany, and Pierre L. Lemmens, Brussels, Belgium, assignors to Engetra S.A., Fribourg, Switzerland

Filed Apr. 4, 1986, Ser. No. 848,301

Claims priority, application European Pat. Off., Apr. 15, 1985, 85870053.7; Canada, Oct. 2, 1985, 492103

Int. Cl.[4] B01D *45/08*

U.S. Cl. 55—238 **20 Claims**



1. A device for injecting desulphurized flue gas into a cooling tower for discharge to the atmosphere with the hot air discharged from said tower which comprises: at least one flue gas injection pipe for insertion through the shell of said cooling tower; a slot in the upper part of said pipe extending along at least a part of its length and providing communication between said pipe and a slot enclosing compartment, said slot serving to regulate the speed of said flue gas through said pipe and into said compartment; and a drop separator on at least one side of said slot in communication with said compartment, said drop separator defining a panel through which said flue gas is injected into the hot air of said cooling tower at a point above the exchange body of said cooling tower, said at least one separator panel forming at least one side wall of said compartment.

4,673,422

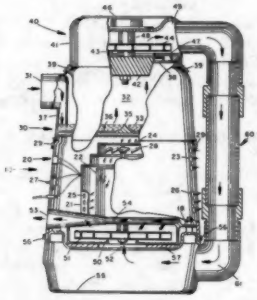
AIR CLEANING SYSTEM

John H. Tidwell, Rte. 1, Box 267, Ashville, Ala. 35953

Filed Oct. 4, 1985, Ser. No. 784,209

Int. Cl.[4] B01D *47/02*

U.S. Cl. 55—248 **8 Claims**



1. An air cleaning system comprising:

a motor housing;

a motor mounted within said housing;

a fan attached to and rotatably driven by said motor;

a fan chamber surrounding said fan and having an air inlet and outlet;

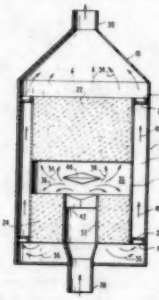
a separator housing means mounted adjacent to and in spaced relation with said motor housing, said separator housing means having an inlet disposed in communication with a chamber within said separator housing means, and, an outlet disposed in communication with said fan chamber; and, an air driven separator means mounted in said chamber of said separator housing means to receive airflow from said inlet thereof for rotation of said separator means and removal of foreign matter from said airflow by centrifugal force responsive to rotation of said separator means, said airflow being further directed through said outlet of said separator housing means to said fan chamber to be ejected by said fan therein.

4,673,423

SPLIT FLOW PARTICULATE FILTER

Salih V. Yumlu, Hagerstown, Md., assignor to Mack Trucks, Inc., Allentown, Pa.

Filed Jul. 23, 1985, Ser. No. 758,062
Int. Cl.[4] B01D *46/12*
U.S. Cl. 55—319 **6 Claims**



1. A particulate filter for engine exhaust gases comprising:

(a) a housing;

(b) first and second filter members arranged within said housing, said filter members being spaced from each other and including means providing a confined space between said filter members;

(c) said filter members being spaced from said housing to provide an annular space between said filter members and said housing;

(d) means providing an inlet into said housing for supplying exhaust gases to said confined space;

(e) means defining an outlet from said housing for exhaust gases;

(f) said exhaust gases being directed from said confined space along two paths, one path extending through said first filter member to said outlet and the other path extending through said second filter member and through said annular space to said outlet;

(g) said second filter member including a central passage therethrough and said inlet extending through said passage to said confined space; and

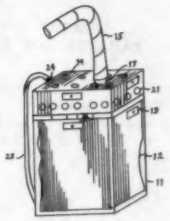
(h) a swirler disposed in said central passage adjacent said confined space to distribute exhaust gases more uniformly over the surfaces of said filter members facing said confined space, said swirler having a radial dimension substantially the same as that of said central passage.

4,673,424

COMBINATION TRASH CAN AND VACUUM CLEANER ATTACHMENT

Kenneth A. Range, 4 Pine Tree Dr., Shoreview, Minn. 55112

Filed Jun. 13, 1986, Ser. No. 873,998
Int. Cl.[4] B01D *46/00*
U.S. Cl. 55—356 **1 Claim**



1. A portable trash can designed to be attached to a conventional vacuum cleaner, said device comprising:

a generally rectangular container;

a grocery bag disposed within said container, the top of said grocery bag being folded over the top edges of said container;

a generally rectangular top piece fitting over said top edges of said container, said top piece being sealed to said container by gasket means, said top piece having a plurality of airholes formed into its top and side surfaces;

filter means disposed within said top piece;

vacuum hose means attached to a cylindrical projection on said top piece, and capable of being attached at its other end to the nozzle of said conventional vacuum cleaner;

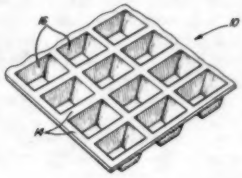
adjustable and removeable shoulder strap means attached by ring-like attachments to said container, said strap means permitting said device to be portable.

4,673,425

DISPOSABLE LINER FOR PAINT BOOTH GRATING

Gene Hirs, 6865 Meadowlake Rd., Birmingham, Mich. 48010

Filed Sep. 12, 1986, Ser. No. 906,482
Int. Cl.[4] B01D *45/08*
U.S. Cl. 55—435 **1 Claim**



1. A method of protecting the surfaces of a grating against build-up of airborne or spilled contaminants which are not easily removable, while maintaining the porosity of the grating to airflow, which comprises the steps of:

applying a disposable molded cover to the upstream side of the grating, said cover having a plurality of formations which are shaped and dimensioned so that each formation will nest into one of the respective openings of the grating and will project into such opening a sufficient distance to act as a protective barrier to prevent airborne contaminants from coming into contact with the grating, each of said formations having a hole which allows airflow through the cover formation and through the associated grating openings;

and removing said cover from the grating when the holes have become sufficiently occluded to interfere with ade-

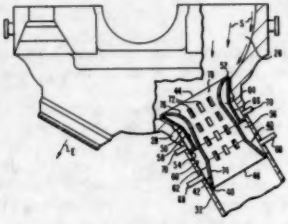
quate airflow through the covered grating, and installing a clean replacement cover on the grating.

4,673,426

MOISTURE PRE-SEPARATOR FOR A STEAM TURBINE EXHAUST

George J. Silvestri, Jr., Winter Park, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 14, 1986, Ser. No. 829,743
Int. Cl.[4] B01D *45/12*
U.S. Cl. 55—457 5 Claims



1. A moisture pre-separator for an exhaust portion of a steam turbine, said exhaust portion including an exhaust hood, said exhaust hood enclosing an exhaust hood chamber, said exhaust hood including wall means having exhaust nozzle means passing therethrough, piping means affixed to said nozzle means, said moisture pre-separator comprising:

(a) a first inner hollow member having an inlet end extending into said exhaust hood chamber, and an outlet end having a final diameter equal to the inside diameter of said piping means, said first inner hollow member affixed to said piping means at the outlet end thereof to form a jointure in sealing relationship said piping means;

(b) a second hollow inner member disposed concentrically around said first hollow inner member, said second hollow inner member affixed at one end to said inlet end of said first hollow inner member, said second hollow inner member affixed at the other end to said piping means;

(c) first channel means formed between the inner surface of said second hollow member, the inner surface of said piping means and the outer surface of said first hollow member;

(d) second channel means formed between the outer surface of said second hollow member and the inner surface of said wall means;

(e) first drain means in fluid communication with said first channel means for draining said first channel means;

(f) second drain means in fluid communication with said second channel means for draining said second channel means;

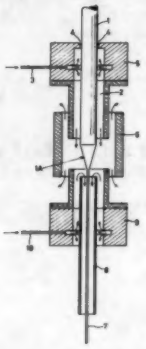
(g) said first hollow inner member having aperture means therethrough in predetermined position proximate said inlet end, whereby a substantial portion of the water flowing on the walls of said exhaust hood is captured by said second channel means and drained by said second drain means and said first inner hollow member constricts the flow of the fluid containing steam with entrained moisture causing a substantial portion of the entrained water to form on the inner surface of said first hollow member which passes through said apertures and is captured by the first channel means and drained by the first drain means.

4,673,427

METHOD OF AND DEVICE FOR DRAWING AN OPTICAL FIBER FROM A SOLID PREFORM CONSISTING SUBSTANTIALLY OF SiO_2 AND DOPED SiO_2

Aart A. Van Der Giessen; Victor A. Van Der Hulst, and Petrus J. Janssen, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 28, 1983, Ser. No. 536,483
Claims priority, application Netherlands, Oct. 4, 1982, 8203843
Int. Cl.[4] C03B *37/027*
U.S. Cl. 65—2 7 Claims



1. A method of drawing an optical fiber from a solid preform comprising SiO_2 and doped SiO_2, said method comprising the steps of:

heating an end of the preform to a temperature above 2000° C. in a furnace;

drawing an optical fiber from the heated end of the preform out of the furnace; and

flowing a gas through the furnace to heat the gas to substantially the temperature of the fiber at the end of the preform, and then flowing the hot gas out of the furnace along the fiber at substantially the same speed as the fiber is drawn from the furnace, wherein the gas flow is laminar flow and the ggs flows along the fiber for a selected time and distance chosen to assure that the temperature gradient in the fiber is always less than that at which stresses are produced which would increase the optical attenuation of the fiber.

4,673,428

METHOD AND APPARATUS FOR FORMING GLASS FIBERS

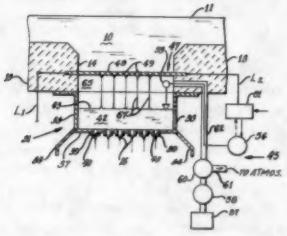
Neil E. Greene, Granville; Lawrence J. Grubka, Heath, and Randall E. Nyhart, Granville, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Dec. 17, 1985, Ser. No. 809,998
Int. Cl.[4] C03B *37/02*
U.S. Cl. 65—2 8 Claims

1. A method of forming glass filaments comprising:

establishing a layer of molten glass over an orificed discharge wall adapted to provide streams of molten glass for attenuation into filaments, the depth of the layer of molten glass providing a head pressure at the orifices of the discharge wall effective to establish dripless operation, the top surface of the layer being in contact with a body of fluid; providing a body of molten glass immediately above said fluid; and providing a flow control means for controlling the pressure of the fluid such that the effective head pressure of the glass at the discharge wall is increased to establish non-dripless operation to facilitate the restart of

the flow of molten material from orifices at which attenuation has been disrupted, wherein said flow control means includes a backflow regulator means adapted to permit the



pressure of the fluid to be increased to a pressure greater than the effective bead pressure of the body of glass at said flow control means.

4,673,429

NITRIFICATION-INHIBITING 1-HYDROXYPYRAZOLE DERIVATIVES

Norbert Rieber, Mannheim; Heinrich Boehm, Neuhofen; Ernst-Heinrich Pommer, Limburgerhof, and Juergen Dressel, Neuhofen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

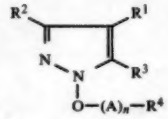
Filed Mar. 13, 1985, Ser. No. 711,204

Claims priority, application Fed. Rep. of Germany, Mar. 14, 1984, 3409317.6

Int. Cl.[4] C05C *1/00*; C07D *231/16*

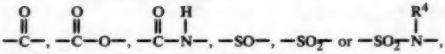
U.S. Cl. 71—27 **2 Claims**

1. A composition of matter which is a 1-hydroxypyrazole derivative of the formula (I)



(I)

where A is



n is 0 or 1, R^1, R^2 and R^3 independently of one another are each hydrogen, chlorine, bromine or iodine, and R^4 is hydrogen, a straight-chain or branched, open-chain alkyl, alkenyl or alkynyl radical, a cyclic alkyl, alkenyl or alkynyl radical or carbocyclic aryl or carbocyclic aralkyl, with the proviso that R^4 is not hydrogen when n is 0, and the radicals R^4 which are capable of being substituted may furthermore be monosubstituted or polysubstituted by halogen, haloalkyl, haloalkoxy, alkyl, alkoxy, alkoxycarbonyl, —OH, =O, —COOH or a salt of this, $—NO_2$ or —CN.

2. A method of inhibiting nitrification of ammonium nitrogen in the soil which comprises treating the soil with an effective amount of a nitrification-inhibiting composition as defined by claim 1.

4,673,430

METHOD FOR THE PRODUCTION OF NICKEL POWDER

Leonard B. Pfeil, Birmingham, England, assignor to Inco Limited, Toronto, Canada

Filed Mar. 25, 1947, Ser. No. 737,085

Claims priority, application United Kingdom, Apr. 4, 1946, 10505/46

Int. Cl.[4] B22F *1/00*

U.S. Cl. 75—0.5 AA **4 Claims**

1. An improved method for producing fine nickel powder having a substantially spherical form and size ranging from about 3 microns to about 7 microns, containing sulphur within a critical range of about 0.02% to about 0.05%, and possessing an improved degree of smoothness and susceptibility for the production of sintered nickel articles of controlled porosity and uniformly good mechanical properties and for uniform sintering at lower sintering temperatures and in shorter sintering periods than when conventional particles of carbonyl decomposed nickel powders are used which comprises vaporizing about one hundred parts per hour of liquid nickel carbonyl into a decomposition vessel having an internal pressure equal to about eight inches of water (gauge), simultaneously introducing about twenty parts of hydrogen sulphide gas per hour at a pressure of about one-half inch of water (gauge) into said vessel, and thermally decomposing the mixture of nickel carbonyl vapor and hydrogen sulphide gas at at a temperature of about 280° C. to about 310° C. to produce said fine nickel powder containing said sulphur within said critical range.

3. As a new article of manufacture, an improved carbonyl decomposed nickel powder possessing an improved degree of smoothness and susceptibility for the production of sintered nickel articles of controlled porosity and uniform good mechanical properties and for sintering at lower sintering temperatures and in shorter sintering periods than when conventional sulphur-free particles of carbonyl decomposed nickel powder are used, said powder constituted of finely divided particles having a substantially spherical form and a size within a range of about 3 microns to about 7 microns and containing a small amount of sulphur within a range of about 0.004% to about 0.1%.

4,673,431

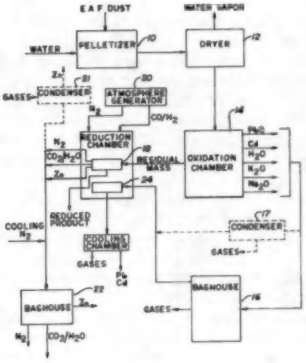
FURNACE DUST RECOVERY PROCESS

Francis H. Bricmont, Pittsburgh, Pa., assignor to Bricmont & Associates, Inc., McMurray, Pa.

Filed Jan. 8, 1986, Ser. No. 817,063

Int. Cl.[4] C22B *7/02*

U.S. Cl. 75—25 **22 Claims**



1. A process for removing lead oxide which forms a leach-

able contaminant from zinc oxide in recovered waste dust, the process including the steps of,

heating the waste dust in an oxidizing atmosphere to a temperature which is sufficient to form lead oxide vapors,

separating said lead oxide vapors from the the fluid or sinter mass in the oxidizing atmosphere which mass includes zinc oxide,

solidifying the lead oxide vapors, and

recovering the solidifed lead oxide vapors.

4,673,432

PROCESS FOR THE PRODUCTION OF PIG IRON

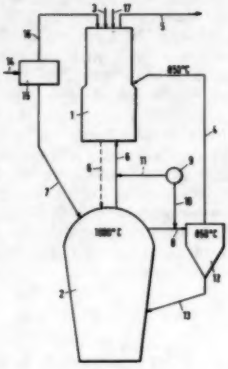
Rolf Hauk, Düsseldorf, Fed. Rep. of Germany, assignor to Korf Engineering GmbH, Dusseldorf, Fed. Rep. of Germany and Voest-Alpine Aktiengesellschaft, Linz, Austria

Filed Jan. 16, 1986, Ser. No. 819,404

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1985, 3503493

Int. Cl.⁴ C21B *13/14*

U.S. Cl. 75—38 **8 Claims**



1. Process for producing pig iron from iron ore comprising steps of: providing a direct reduction shaft furnace and a separate melt-down gasifier;

supplying lumpy iron ore to the direct reduction shaft furnace;

supplying hot reduction gas to the direct reduction shaft furnace;

reducing the iron ore to sponge iron in the direct reduction shaft furnace using the hot reduction gas in the direct reduction shaft furnace;

supplying the sponge iron to the melt-down gasifier;

melting the sponge iron in the melt-down gasifier;

supplying a carbon carrier and an oxygen-containing gas to the melt-down gasifier;

forming additional reduction gas in the melt-down gasifier;

supplying the additional reduction gas from the melt-down gasifier to the direct reduction shaft furnace for use therein to reduce iron ore to sponge iron;

dividing a high temperature carbonized coke into coarse particles and fine particles;

supplying the fine particles of the carbonized coke as the carbonized carrier to the melt-down gasifier; and

supplying the coarse particles of the high temperature carbonized coke to the direct reduction shaft furnace along with the iron ore being supplied thereto.

4,673,433

LOW-ALLOY STEEL MATERIAL, DIE BLOCKS AND OTHER HEAVY FORGINGS MADE THEREOF AND A METHOD TO MANUFACTURE THE MATERIAL

William Roberts, Hagfors, Sweden, assignor to Uddeholm Tooling Aktiebolag, Hagfors, Sweden

Filed May 28, 1986, Ser. No. 867,566

Int. Cl.⁴ C21C *7/02*

U.S. Cl. 75—53 **10 Claims**

1. A method for manufacturing a low-alloy steel product having a very high hardenability in relation to its alloying content, said method comprising the steps of:

melting at least the bulk of a steel composition containing a majority of alloy ingredients to produce a steel melt;

superheating said steel melt at a temperature of at least 1625° C. and maintaining said melt at said temperature for at least two minutes to form a superheated melt;

prior to said super heating adding to said steel composition a micro-alloying ingredient selected from the group consisting of aluminum, titanium, and aluminum and titanium together;

teeming and casting said superheated melt to form ingots; and

hot-working said ingots to form said low alloy steel product.

4,673,434

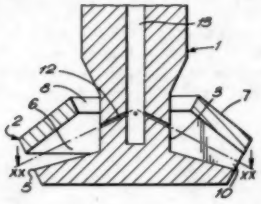
USING A ROTARY DEVICE FOR TREATING MOLTEN METAL

Christopher J. Withers, Stourbridge, and David W. Pattle, Lichfield, both of United Kingdom, assignors to Foseco International Limited, Birmingham, England

Division of Ser. No. 797,022, Nov. 12, 1985. This application Aug. 4, 1986, Ser. No. 892,813

Int. Cl.⁴ C21C *7/00*

U.S. Cl. 75—61 **6 Claims**



1. A method for the treatment of molten metal utilizing a rotary device comprising a hollow shaft and a hollow rotor affixedly attached to the shaft, the rotor comprising top, bottom and peripheral surfaces and a hollow interior and said rotor having a plurality of vanes each extending from the shaft towards the peripheral surface of the rotor so that the hollow interior of the rotor is divided into a plurality of compartments, with at least one aperture in at least one of the top and bottom surfaces of the rotor adjacent the shaft and at least one aperture in the peripheral surface of the rotor, and at least one duct for the passage of gas from the hollow interior of the shaft to each of the compartments, the method comprising the steps of:

dispersing a gas in molten metal contained in a vessel by rotating the shaft so that the molten metal enters each of the compartments through the at least one aperture in the at least one of the top and bottom surfaces, and flows outwardly through the at least one aperture in the peripheral surface, supplying gas to the at least one duct, and passing the gas from the hollow interior of the shaft to each of the compartments to be dispersed in molten metal within the compartments.

4,673,435

ALUMINA COMPOSITE BODY AND METHOD FOR ITS MANUFACTURE

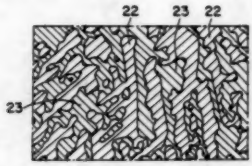
Masayoshi Yamaguchi; Kazunori Meguro; Shuitsu Matsuo, all of Oguni, and Yasumi Sasaki, Nagai, all of Japan, assignors to Toshiba Ceramics Co., Ltd., Tokyo, Japan

Filed Apr. 24, 1986, Ser. No. 855,448

Claims priority, application Japan, May 21, 1985, 60-106931; May 21, 1985, 60-106932; May 21, 1985, 60-106933; May 21, 1985, 60-106936; May 21, 1985, 60-106942

Int. Cl.[4] C22C 29/12

U.S. Cl. 75—235 10 Claims



1. An alumina composite body comprising a plurality of elongated alumina elements oriented in random directions and interconnected so as to constitute a porous matrix, and aluminum and silicon tightly filling said porous matrix.

4,673,436

N, S CONTAINING CORROSION INHIBITORS

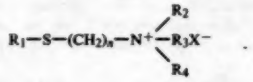
John A. Haslegrave, Abingdon, United Kingdom, and Daniel S. Sullivan, Houston, Tex., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Apr. 22, 1986, Ser. No. 855,020

Int. Cl.[4] C04B 9/02

U.S. Cl. 106—14.13 20 Claims

1. A method of inhibiting corrosion of metals, which comprises treating a system wherein metals are susceptible to corrosion with a corrosion inhibiting amount of a thio substituted quaternary ammonium salt having the structure:



wherein R_1 is hydrogen or a hydrocarbyl group having 6 to 30 carbon atoms; n is 0 to 18;

R_2, R_3 and R_4 are independently selected from hydrogen, alkyl or aralkyl groups having 1 to 30 carbon atoms and X is an anion.

4,673,437

CONCRETE BLOCK ADDITIVE AND IMPROVED CONCRETE BLOCKS PRODUCED THEREWITH

Lawrence F. Gelbman, 86 Hamilton Ave., Yonkers, N.Y. 10705

Continuation-in-part of Ser. No. 623,989, Jun. 25, 1984, Pat. No. 4,568,390. This application Jan. 30, 1986, Ser. No. 824,059

The portion of the term of this patent subsequent to Feb. 4, 2003, has been disclaimed.

Int. Cl.[4] C04B 7/02

U.S. Cl. 106—97 43 Claims

1. A concrete block mold mix for the production of concrete blocks in a vibratory concrete block molding machine in which the mold mix comprises cement, water in an amount only sufficient to hydrate the cement, and from about 2 to about 14 quarts, per 3 cubic yards of mold mix, of a colloidal suspension of a member selected from the group consisting of attapulgite or peptized calcium bentonite in water in a weight ratio of attapulgite or peptized calcium bentonite to water of from about 1:4 to about 1:20.

28. In a process for molding concrete blocks in a vibratory concrete block molding machine the improvement comprising using as the block mold mix a formulation comprising 3 to 6 quarts of a 1:10 weight ratio of a colloidal suspension of water and a member selected from the group consisting of attapulgite and peptized calcium bentonite per 3 cubic yards of a concrete block mix comprising about 3500 to about 2625 lbs. lightweight aggregate, about 2000 to about 3250 lbs. fines, about 550 to about 600 lbs. Portland cement and water sufficient to hydrate the cement.

4,673,438

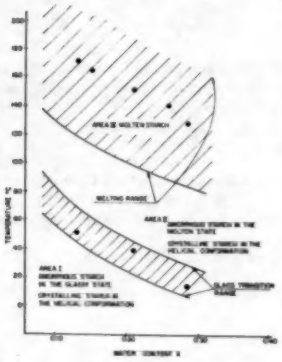
POLYMER COMPOSITION FOR INJECTION MOLDING

Fritz Wittwer, Lupsingen, and Ivan Tomka, Bourguillon, both of Switzerland, assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation of Ser. No. 579,318, Feb. 13, 1984, abandoned, which is a continuation-in-part of Ser. No. 467,982, Feb. 18, 1983, abandoned. This application Nov. 8, 1985, Ser. No. 796,517

Int. Cl.[4] C09H 11/00; C08L 3/00; B28B 7/20

U.S. Cl. 106—126 24 Claims



1. A process for forming starch into an article using an injection molding technique which process comprises:

(a) maintaining a starch/water composition at a water content between 5–30% by weight of the composition under controlled conditions of temperature and pressure,

(b) heating said starch/water composition at elevated pressure above its glass transition temperature and melting point while maintaining said water content, to form a melt,

(c) further heating and plasticizing said molten starch/water composition to dissolve the starch in the water to form an essentially molecularly dispersed solution of the melt,

(d) injecting the starch/water melt into a mold cavity while maintaining said predetermined water content,

(e) cooling the composition in the mold to form a molded product at a temperature below the glass transition temperature of said composition and,

(f) ejecting the molded product from said mold.

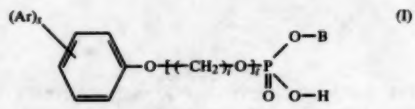
4,673,439

SIZING AGENT FOR PAPER MAKING

Yoshio Takahashi, and Shigeto Hatanaka, both of Kanagawa, Japan, assignors to Mitsubishi Oil Co., Ltd., Tokyo, Japan

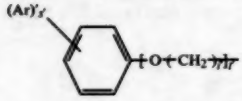
Filed Mar. 14, 1986, Ser. No. 839,388
Claims priority, application Japan, Mar. 15, 1985, 60-50519
Int. Cl.[4] D21D 3/00; C08L 3/00
U.S. Cl. 106—287.24 20 Claims

1. A sizing agent for paper making comprising (A) a reaction product obtained by an addition reaction comprising heating an olefin having 14 to 20 carbon atoms or a mixture thereof with maleic anhydride in the absence of a Ziegler catalyst at atmospheric pressure or higher pressure in an inert gas atmosphere and (B) one or more emulsifiers selected from polyoxyalkylene aralkylaryl ether phosphoric acid esters or salts thereof, wherein said polyoxyalkylene aralkylaryl either phosphoric acid esters are compounds represented by the following general formula (I):



(I)

wherein Ar represents an aralkyl group; s represents an integer of 1 to 5; t represents an integer of 3 or more; i represents an integer of 2 to 4; and B represents a hydrogen atom or



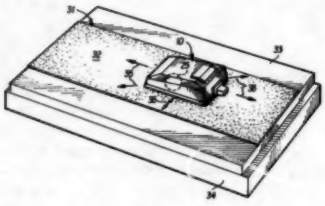
wherein (Ar)' represents an aralkyl group; s' represents an integer of 1 to 5 and t' represents an integer of 3 or more; and i' represents an integer of 2 to 4.

4,673,440

METHODS OF AND APPARATUS FOR CLEANING THE INTERIOR OF A MOUSE

Stephen R. Chapin, Jr., 3809 Chesterwood Dr., Silver Spring, Md. 20906

Filed Aug. 22, 1985, Ser. No. 768,383
Int. Cl.[4] B08B 9/00
U.S. Cl. 134—8 9 Claims



1. A method of cleaning the interior of an electro-mechanical device wherein the device normally includes a substantially spherical cavity having electro-mechanical transducers therein which are operated by a sphere rolling within the cavity, the method comprising the steps of:

(a) removing the sphere from the cavity;

(b) inserting in the cavity a cleaning sphere having a mechanically adhesive surface thereon;

(c) rolling the cleaning sphere around within the cavity to collect dust and debris on the mechanically adhesive surface; and

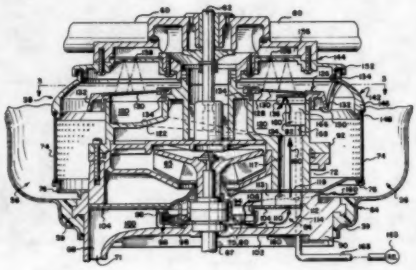
(d) removing the cleaning sphere from the cavity after collecting the dust and debris on the cleaning sphere.

4,673,441

DISHWASHING METHOD

Theodore F. Mayers, c/o Hobart Corporation, World Headquarters Bldg., Troy, Ohio 45374

Division of Ser. No. 434,980, Oct. 18, 1982, Pat. No. 4,559,959.
This application Dec. 4, 1984, Ser. No. 677,970
Int. Cl.[4] B08B 7/04
U.S. Cl. 134—18 7 Claims



1. In a method of washing soiled ware placed within a wash chamber of a dishwasher, said chamber having a sump at the bottom thereof, the improvement comprising the steps of:

(a) conducting at leat one prewash, each of said prewashes including:

(i) filling said sump with a cleansing liquid,

(ii) recirculating said liquid from said sump, onto said ware, and back to said sump, for a period of time adequate to rinse said ware

(iii) simultaneous with said recirculation, collecting in concentrated fashion into a soil collection chamber soil particles from said liquid, and

(iv) simultaneous with said collection, continuously monitoring soil concentration within said collection chamber to determine whether said soil concentration therein equals or exceeds a predetermined soil concentration level;

(b) when said concentration equals or exceeds said predetermined level, at any time during any of said prewashes,

(i) draining said sump and said soil collection chamber, and

(ii) conducting an additional said prewash; and

(c) when said soil concentration within said chamber does not equal or exceed said predetermined level, at any time during any of said prewashes,

(i) upon completion of recirculation of said liquid for said predetermined time, draining said sump and said soil collection chamber.

4,673,442

DECOKING PROCESS

Richard D. Kaplan, Flossmoor, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Division of Ser. No. 695,904, Jan. 29, 1985, Pat. No. 4,611,613.
This application Feb. 21, 1986, Ser. No. 832,157
Int. Cl.[4] B08B 3/02, 9/02
U.S. Cl. 134—24 4 Claims

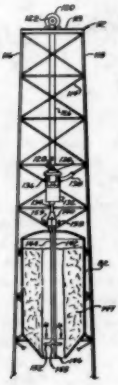
1. A decoking process, comprising the steps of:

(a) lowering a pilot nozzle and reamer of a decoking instrument into a coking vessel;

(b) cutting a vertical pilot hole through a bed of coke in said coking vessel with said pilot nozzle of said decoking in-

strument by injecting a fluid through said pilot nozzle into said bed of coke at a pressure ranging from about 500 psi to about 3500 psi and moving said pilot nozzle and reamer substantially vertically through said bed of coke;

(c) reaming substantially all of the remaining bed of coke with said decoking instrument after step (b) while maintaining said pilot nozzle and reamer in fixed relationship to each other without removing said pilot nozzle and reamer of said decoking instrument from said coking vessel or adjusting the span and distance between said pilot nozzle



and reamer, said reaming including substantially stopping the flow of fluid to said pilot nozzle, injecting said fluid through said reamer into said remaining bed of coke at a pressure ranging from about 500 psi to about 3000 psi and, thereafter, moving said reamer and pilot nozzle substantially vertically through said bed of coke while concurrent rotating said reamer to radially cut and substantially remove said remaining bed of coke; and

(d) stopping the flow of fluid to said reamer and withdrawing said pilot nozzle and reamer of said decoking instrument from said decoking vessel.

4,673,443

CONTINUOUS IONIZER FOR SEMICONDUCTOR MANUFACTURING PROCESSES

Allan M. Fetty, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 18, 1985, Ser. No. 713,158

Int. Cl.[4] B08B *1/00, 7/04;* B01D *47/02, 47/100*

U.S. Cl. 134—25.4 **10 Claims**

1. An improved method for scrubbing a semiconductor mask having a metal pattern thereon with a stream of ionized liquid comprising spraying the liquid through air onto the mask, the improvements comprising introducing ions to a continuous stream of deionized liquid for use in scrubbing the semiconductor mask by passing a continuous stream of deionized liquid through a continuous ionizer wherein:

deionized liquid enters said ionizer through a liquid inlet;

the liquid subsequently travels along a convoluted liquid pathway;

an ionizing gas is bubbled through the liquid travelling along the convoluted liquid pathway to react with the liquid and form soluble ions; and

the liquid containing soluble ions leaves the ionizer through a liquid outlet.

4,673,444

PROCESS FOR PHOSPHATING METAL SURFACES

Koichi Saito; Yasutake Mino, and Ryoichi Murakami, all of c/o Nippon Paint Co., Ltd., 19-17 Ikedanakamachi, Japan

Continuation of Ser. No. 525,852, Aug. 23, 1983, abandoned, which is a continuation-in-part of Ser. No. 358,065, Mar. 12, 1982, abandoned. This application Oct. 1, 1985, Ser. No. 783,059

Claims priority, application Japan, Mar. 16, 1981, 56-38411; European Pat. Off., Aug. 22, 1983, 83304846.5

Int. Cl.[4] C23C *22/14*

U.S. Cl. 148—6.15 Z **19 Claims**

1. A process for phosphating a metal surface comprising contacting the metal surface with an acidic aqueous solution consisting essentially of

(a) from about 0.1 to about 2.0 g/l of zinc ion,

(b) from about 5 to about 30 g/l of phosphate ion,

(c) from about 0.2 to about 3 g/l of manganese ion,

(d) a conversion coating accelerator which is a combination of

(i) from about 0.01 to about 0.2 g/l of nitrite ion, and

(ii) from about 0.05 to about 1.9 g/l of chlorate ion, and

(e) from about 1 to about 10 g/l of nitrate ion.

4,673,445

CORROSION RESISTANT COATING

James N. Tuttle, Jr., Litchfield, and Olyn P. Jaboin, Wolcott, both of Conn., assignors to The LEA Manufacturing Company, Waterbury, Conn.

Filed May 12, 1986, Ser. No. 861,834

Int. Cl.[4] C23C *22/82*

U.S. Cl. 148—6.15 R **3 Claims**

1. A treatment solution for increasing the corrosion resistance of an iron or steel part coated with a phosphate conversion coating, said treatment solution consisting of an aqueous solution of stannous ions and a member selected from the group of cobalt and nickel ions, said stannous ions being in a concentration of between 10 and 1,000 grams per liter of solution and said nickel or cobalt ions being in a concentration of between 1 to 200 grams per liter of solution.

4,673,446

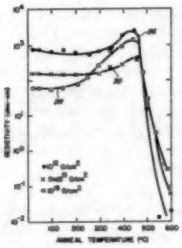
METHOD OF FORMING THERMALLY STABLE HIGH RESISTIVITY REGIONS IN N-TYPE INDIUM PHOSPHIDE BY OXYGEN IMPLANTATION

Phillip E. Thompson, Springfield, and Harry B. Dietrich, Fairfax, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 12, 1985, Ser. No. 808,699

Int. Cl.[4] H01L *21/265, 21/26*

U.S. Cl. 148—33 **11 Claims**



1. A method of forming thermally stable high resistivity isolation regions in a n-type InP active layer disposed on a S.I. InP substrate wafer comprising the step of forming selected regions of said active layer with oxygen ions, said regions extending into said S.I. InP substrate.

4,673,447

METHOD FOR SUPPORTING A METAL STRIP UNDER STATIC GAS PRESSURE

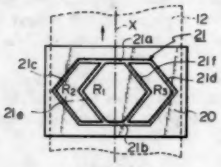
Kango Sakai, Kitakyushu, and Yasuo Shimokawa, Fukuoka, both of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Division of Ser. No. 667,386, Nov. 2, 1984, abandoned, which is a continuation of Ser. No. 442,134, Nov. 16, 1982, abandoned, which is a continuation-in-part of Ser. No. 258,473, Apr. 28, 1981, abandoned. This application Sep. 13, 1985, Ser. No. 775,695

Claims priority, application Japan, Apr. 30, 1980, 55-56129; Oct. 6, 1980, 55-138671

Int. Cl.[4] C21D *1/00*

U.S. Cl. 148—156 9 Claims



1. In a method for supporting a metal strip moving in a predetermined path with static gas pressure generated on both sides of said metal strip, said method comprising:

ejecting a heating or cooling gas from a pair of gas pressure pads facing each other and located symmetrically about said predetermined moving path of said metal strip, wherein said ejecting takes place onto both surfaces of said metal strip moving along said predetermined moving path between said pair of gas pressure pads, wherein

each gas pressure pad is provided with a gas ejecting opening with said heating or cooling gas being ejected therethrough,

each said opening being formed in a front surface of each gas pressure pad facing said moving strip,

each said opening being composed of a pair of transverse slits with each transverse slit extending in a direction at right angles to the longitudinal axis of said predetermined moving path of said metal strip and at least two pairs of supplementary slits each connecting therethrough said transverse slits to each other thereby providing a closed channel-shaped opening,

each said opening being symmetrical about the longitudinal center line of the front surface of the respective gas pressure pad, each said center line being parallel to said longitudinal axis of said predetermined moving path whereby said ejecting of gas forms a closed curtain-shaped stream of said ejected heating or cooling gas defining at least three closed regions between each surface of said moving metal strip and each gas pressure pad front surface facing the metal strip surface, thereby creating static gas pressure in said closed regions with said static gas pressure in said closed regions being symmetrical about the longitudinal axis of said predetermined path of said moving strip,

the improvement comprising:

each of said supplementary slits has its longitudinal axis lying in the plane parallel to the longitudinal axis of said predetermined moving path of said metal strip and inclined with respect to the longitudinal axis of said predetermined moving path of said metal strip, and

ejecting curtain segments of said heating or cooling gas from said supplementary slits thereby contacting both surfaces of said moving metal strip at said incline of said supplementary slits and substantially reducing localized overheating or over-cooling of said metal strip.

4,673,448

SLIDER FOR RIBBON, PARTICULARLY FOR CLOTHING ARTICLES, PROCESS FOR ASSEMBLING THEREOF AND RELATIVE APPARATUS

Dario Bartolini, Impruneta, Italy, assignor to Lovable Industriale S.p.A., Grassobbio, Italy

Filed Feb. 4, 1985, Ser. No. 697,762

Claims priority, application Italy, Feb. 2, 1984, 19431 A/84; May 16, 1984, 20960 A/84; Nov. 30, 1984, 23823 A/84

Int. Cl.[4] A44B *11/28;* B29C *65/08*

U.S. Cl. 156—73.1 7 Claims

1. A process for assembling a slider and a ribbon in order to obtain a slider-ribbon unit with adjustable length, the slider being a two-slot type having a bridge section between the slots formed by two elastically flexible arms and a fastening area for fastening to the ribbon; said process comprising the steps of inserting an intermediate portion of the ribbon length into the slots and beyond the arms, by elastically deforming the arms, and leaving said intermediate portion beyond the arms in a loop when the arms spring back, then welding one end of the ribbon folded back in a loop onto the slider and pulling out the ribbon loop against the slider, the fastening area of the slider being located on said deformable arms, whereby said arms are linked together by the ribbon welded thereto.

4,673,449

SEALING OF A PIPE-JOINT

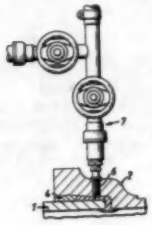
Stephen F. Webb, Tyldesley, and Brian J. Merrick, Urmston, both of England, assignors to British Gas Corporation, London, England

Filed Jun. 7, 1985, Ser. No. 742,226

Claims priority, application United Kingdom, Jun. 7, 1984, 8414544

Int. Cl.[4] B32B *35/00*

U.S. Cl. 156—94 3 Claims



1. A method for sealing a joint in a gas bearing pipe, comprising the steps of:

drilling at least one hole in a joint gap at a point upstream of a pre-existing annular joint seal with respect to a flow direction of leaking gas;

injecting an anaerobically curable monomer into said joint gap in such a quantity that said monomer forms a contiguous band within said joint gap; and

allowing said monomer to cure within said joint,

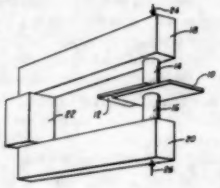
wherein said drilling step comprises the steps of sequentially drilling a plurality of circumferentially spaced holes and wherein said injecting step comprises injecting said monomer into a drilled hole prior to drilling any subsequent hole of said plurality of holes.

4,673,450

METHOD OF WELDING TOGETHER GRAPHITE FIBER REINFORCED THERMOPLASTIC LAMINATES

James H. Burke, Valley Center, Kans., assignor to The Boeing Company, Seattle, Wash.

Filed Jan. 22, 1985, Ser. No. 693,332
Int. Cl.[4] B32B 31/22
U.S. Cl. 156—153 5 Claims



1. A method of welding together parts formed of graphite-fiber reinforced polyetheretherketone laminates, comprising the steps of:

disposing two said parts in surface contact between a pair of opposed electrodes;

applying pressure through said electrodes to the area of said surface contact;

applying voltage and amperage across said electrode sufficient to soften the polyetheretherketone in surface contact between said electrodes; and

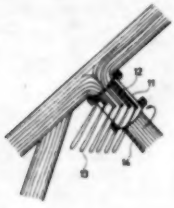
cooling said parts in said surface contact to form a weld.

4,673,451

METHOD FOR MANUFACTURE OF FIBER REINFORCED RESIN STRUCTURE SUCH AS A STEERING WHEEL CORE MEMBER

Yasushi Yamazawa; Katsumi Kondo; Yasuhiro Tsutiya; Takatsune Niimi; Takashi Yamamoto, and Kunihiro Matsuba, all of Aichi, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Jul. 18, 1985, Ser. No. 756,319
Claims priority, application Japan, Sep. 3, 1984, 59-184090; Sep. 3, 1984, 59-184091
Int. Cl.[4] B65H 81/00; B62D 1/04
U.S. Cl. 156—172 5 Claims



1. A method for the manufacture of a fiber reinforced resin structure having branched portions, comprising:

winding a long continuous resin impregnated fiber strand repeatedly on a molding jig having a predetermined structure, said fiber strand near each of said branched portions being wound in a plurality of extended loops which are drawn out of said long continuous resin impregnated fiber strand, with said loops capable of being wrapped about the winding of fibers at the branched portions;

winding said fiber strand loops tightly around each of the branched portions of the structure; and

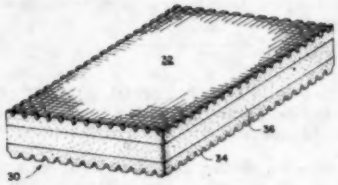
hardening said resin.

4,673,452

METHOD OF MAKING FOAM MATTRESS

Deo P. Awdhan, Toronto, Canada, assignor to Reeves Brothers, Inc., Spartanburg, S.C.

Filed Nov. 30, 1984, Ser. No. 676,902
Int. Cl.[4] B32B 31/18
U.S. Cl. 156—254 10 Claims



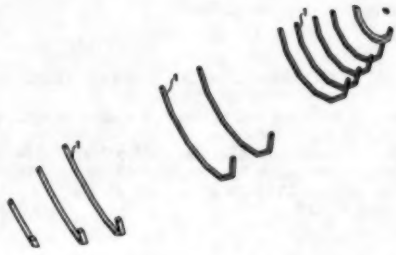
1. A process of forming substantially simultaneously a convolute pattern within opposing outer surfaces of at least two bodies of a plastic foam material comprising locating pairs of said bodies in a surface-to-surface juxtaposed position so that said outer surfaces reside substantially in a common plane, cutting said convolute pattern in each of the juxtaposed surfaces of said bodies as said bodies and a cutting instrumentality are moved in relative motion and said cut moves from one body across said common plane to the other body, separating the bodies after said convolute pattern is cut, and allowing a portion of each protuberance of each body extending beyond said outer surface to break away whereby said convolute pattern in the form of a plurality of flats and cavities resides completely within each body.

4,673,453

METHOD OF MAKING A STRUCTURAL BODY

Hans C. Georgii, Stockholm, Sweden, assignor to AB Hydro Betong, Stockholm, Sweden

Filed May 2, 1984, Ser. No. 606,297
Claims priority, application Sweden, May 4, 1983, 8302555
Int. Cl.[4] B32B 31/18
U.S. Cl. 156—256 7 Claims



1. A method of making a structural body having a complex shape, the steps of which comprise:

providing sheet material comprising a foamed plastic core sandwiched between two layers of thin metal sheeting for providing tensile and compressive strength;

selecting a pattern of laterally joined sections, the whole of said pattern corresponding to said shaped body;

cutting said sheet material into a plurality of shaped sections, each section corresponding to a section of said pattern and some of which differ in configuration from one another, by engaging a first laser on one side of the sheet and a second laser in opposition to said first laser on an opposing side of said sheet, said first and second lasers being controlled by a computer to produce said plurality of shaped sections with planar faces so that said sections can be

assembled side-by-side with adjacent faces which are congruent;

joining said plurality of shaped sections together with pairs of congruent faces in side-by-side contact to form a structural laminated body having curved surfaces and a variable cross-section; and

providing on at least one surface of said structural laminated body a surface layer to provide increased mechanical strength.

4,673,454

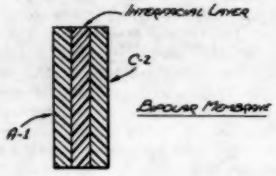
PROCESS FOR PREPARING BIPOLAR MEMBRANES

Kang-Jen Liu, Bridgewater, and Ho-Lun Lee, New Providence, both of N.J., assignors to Chinese Petroleum Corp., Taipei, Taiwan

Division of Ser. No. 554,792, Nov. 23, 1983, Pat. No. 4,584,246. This application Sep. 9, 1985, Ser. No. 773,680

Int. Cl.[4] B32B *31/00*

U.S. Cl. 156—281 **12 Claims**



1. A process for preparing a bipolar membrane which comprises intimately contacting a laminate composed of:

(1) an anionic or cationic ion-exchange layer;

(2) a non-ionic layer containing chemically reactive sites; and

(3) an intermediate layer interposed between said layers 1 and 2 and having ion-exchange domains of the same charge as layer 1 and chemically reactive sites;

with a reagent which converts the reactive sites in both layers 2 and 3 to ionic groups which have a charge opposite to the charge on said ion-exchange layer 1.

4,673,455

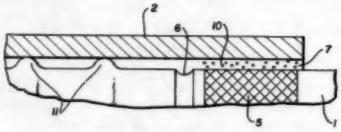
SELF-CENTERING SEALING FOR ELECTRODE STRUCTURE

Michael G. May, Bel Air, Switzerland, assignor to Air, Ltd., Arlington, Va.

Continuation-in-part of Ser. No. 608,735, May 10, 1984, abandoned. This application Nov. 18, 1985, Ser. No. 799,054

Int. Cl.[4] B32B *1/08, 31/04, 31/22*

U.S. Cl. 156—294 **13 Claims**



1. A method for fabricating a gas-tight, electrically insulating fixation zone on a cool end of an elongated electrode structure within an insulating housing and fixing said insulating housing in an outer housing means, comprising the steps of

forming a contact surface area on one end of said elongated electrode structure in said electrically insulating fixation zone,

forming an annular heat and glue barrier groove within said elongated electrode structure inwardly of said contact surface area on an end thereof,

positioning said elongated electrode structure within said insulating housing with a first annular spacing therebetween extending along the length thereof such that said contact surface and said annular barrier groove are confined within one end of said insulating housing,

positioning said insulating housing within said outer housing means with a second annular spacing therebetween extending along the length thereof,

applying a glue which will withstand a cured temperature of at least 220° C. into said first annular spacing between said contact surface area of said elongated electrode structure and said insulating housing and in said second annular spacing between said insulating housing and said outer housing means in said electrically insulating fixation zone radially opposite said contact surface area of said elongated electrode structure whereby said glue flows by capillary action and said flow is limited by said barrier, and

permitting the glue admitted into said first and second annular spacing to cure thereby sealing said electrode within said insulating housing and sealing said insulating housing within said housing means along said electrically insulating fixation zone.

4,673,456

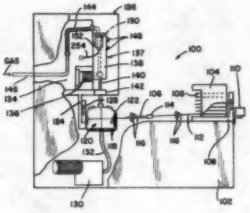
MICROWAVE APPARATUS FOR GENERATING PLASMA AFTERGLOWS

John E. Spencer, Plano; Richard A. Borel, Garland; Kenneth E. Linxwiler, McKinney, all of Tex., and Andrew M. Hoff, State College, Pa., assignors to Machine Technology, Inc., Parsippany, N.J.

Filed Sep. 17, 1985, Ser. No. 777,032

Int. Cl.[4] H01L *21/306;* B44C *1/22*

U.S. Cl. 156—345 **28 Claims**



1. An apparatus for treating a workpiece by a plasma formed from a gas, said apparatus comprising a resonant cavity positioned within said apparatus, transporting means extending through said resonant cavity for transporting a gas therethrough from a source thereof, said transporting means arranged to permit the movement thereof relative to said resonant cavity, a source of energy connected to said resonant cavity for generating a plasma from said gas within said transporting means, a process chamber having a portion movable between an open position and a closed position for receiving a workpiece within said process chamber, said transporting means connected to said portion for transporting said plasma to said process chamber for treating said workpiece, whereby said relative movement between said transporting means and said resonant cavity permits said resonant cavity and said source of energy to remain stationary during the opening and closing of said process chamber.

4,673,457

EXPANDABLE TIRE BUILDING FORMER

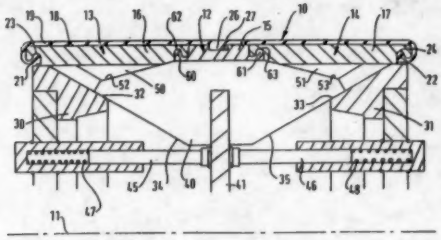
Anthony G. Goodfellow, Maghull, England, assignor to W&A Bates Limited, United Kingdom

Division of Ser. No. 619,182, Jun. 11, 1984, Pat. No. 4,555,287. This application Sep. 11, 1985, Ser. No. 765,153

Claims priority, application United Kingdom, Jun. 29, 1983, 8317687

Int. Cl.[4] B29D *30/24*

U.S. Cl. 156—415 9 Claims



1. An expandable tire building former which in one state has a cylindrical shape and in another state has a frusto-conical shape and which comprises a cylindrical central portion formed from a plurality of radially expandable axially extending central protion segments; two side portions located one on each axial side of the central portion each formed from a plurality of axially extending side portion segments, the axially inner ends of the side portion segments of each side portion being connected to the adjacent axially outer ends of the central portion segments by inter-engaging tongues and grooves so that the side portion sgements can pivot relative to the central portion segments.

4,673,458

METHOD FOR PREPARING A PRINTED CIRCUIT BOARD

Katsukiyo Ishikawa, Kuze; Kanji Nishijima, Ibaraki, and Mamoru Seio, Nishinomiya, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed Mar. 10, 1986, Ser. No. 837,767

Claims priority, application Japan, Mar. 8, 1985, 60-47262

Int. Cl.[4] C23F *1/02*; B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—659.1 3 Claims

1. A method for preparing a printed circuit board with plated-through-holes, comprising

providing a plated board with a number of plated-through-holes,

forming a positive working photoresist on said plated board, exposing said photoresist through a positive mask of circuit pattern placed on said photoresist to an actinic radiation, developing said photoresist on said plated board with an aqueous or a semi-aqueous alkaline solution, thereby removing the exposed area and form an etching resist,

subjecting said resist to an etching to remove copper metal covered with the exposed photoresist on said plated board, and finally removing said resist still remaining on the unexposed area of said plated board,

which is characterized in that the formation of said positive working photoresist is carried out by an electrodeposition process with an anionic or cationic electrodeposition bath containing quinonediazide sulfonic ester bearing acrylic copolymer.

4,673,459

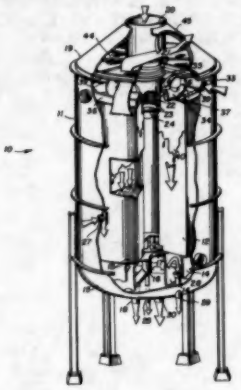
RADIAL CONFIGURATION OF EVAPORATOR HEATING ELEMENTS AND METHOD

Carl L. Elmore; Paul Sherman, and Daniel A. McGrath, all of Glens Falls, N.Y., assignors to Kamyr, Inc., Glens Falls, N.Y.

Filed Jun. 18, 1985, Ser. No. 746,092

Int. Cl.[4] B01D *1/22, 1/26*

U.S. Cl. 159—13.1 17 Claims



1. A free flow evaporator comprising:

a circular cross-section upright cylindrical vessel;

a plurality of heating elements disposed in said vessel and each heating element comprising a pair of spaced generally parallel plates defining a vapor-tight interior volume and each distinct from the vapor-tight interior volumes of the other heating elements;

means for mounting said heating elements in a radial configuration so that they are collectively concentric with the vessel, and each extends radially a distance less than the interior radius of the vessel, and so that the heating elements are circumferentially spaced from, and distinct from, each other;

means for introducing heating vapor to the interior volumes of said heating elements;

means for withdrawing condensate from the interior volumes of said heating elements;

means for introducing liquor to be evaporated adjacent the tops of said heating elements so that it flows downwardly in a thin film over the exteriors of said heating elements; and

means for discharging evaporated liquor vapor from said vessel; and

wherein said means for introducing heating vapor to the interiors of said elements comprises means for introducing the heating vapor concentrically into the top of said vessel, and an annular header communicating with said elements and said concentric introduction means.

4,673,460

DERESINATION METHOD OF WOOD PULP

Donald K. Raff, Duluth, Ga., assignor to Stepan Company, Northfield, Ill.

Filed Sep. 27, 1984, Ser. No. 654,865

Int. Cl.[4] D21C *3/20*

U.S. Cl. 162—75 17 Claims

1. In a process for the production of wood pulp which includes a deresinating step during which wood chips or wood

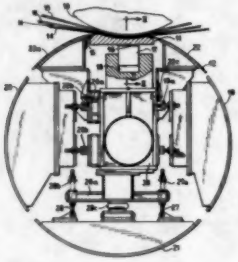
pulp is contacted with a predetermined effective concentration of an ethoxylated alkyl phenol deresinating composition for removing resin which is normally present therein, the improvement comprising substituting a sulfonated fatty acid in direct proportion for part of the ethoxylated alkyl phenol, wherein the resulting substituted deresinating composition mixture of ethoxylated alkyl phenol and sulfonated fatty acid achieves substantially the same level of deresination as the non-substituted deresination composition.

4,673,461

ENCLOSED SHOE PRESS WITH FLEXIBLE END CONNECTIONS FOR ITS ANNULAR BELT

Arnold J. Roerig, Beloit, and Steven C. Shockley, Clinton, both of Wis., assignors to Beloit Corporation, Beloit, Wis.

Filed Nov. 25, 1985, Ser. No. 801,317
Int. Cl.[4] D21F 3/02
U.S. Cl. 162—205 11 Claims



1. In an extended nip press for removing water from a traveling web in a paper machine, comprising in combination:

a rotatable press roll;

an elongate shoe having a concave pressing surface facing the roll so that a dewatering press nip is formed between the shoe and roll;

means for applying a force urging the shoe towards the roll so that a web is subjected to dewatering pressure in the nip;

a continuous looped annular belt passing through the nip and extending beyond the lateral ends of the shoe;

means for supplying lubricant to the leading edge of the shoe to build up a wedge of lubricant between the shoe and belt;

end walls on the axial ends of said belt for containing lubricant within the belt; and

a flexible annular connector joining the said end wall to the belt and having a radial dimension sufficient so that the belt flexes and conforms to the curvature of the shoe beyond the lateral ends of the shoe with said connectors absorbing the relative deflection between said end wall and belt.

9. The method of containing lubricant within a continuous looped annular belt passing through a lubricated extended nip between a concave shoe and a roll with the shoe pressed to the roll to dewater a web passing through the nip, the belt extending beyond the lateral ends of the shoe and roll, which comprises the steps of:

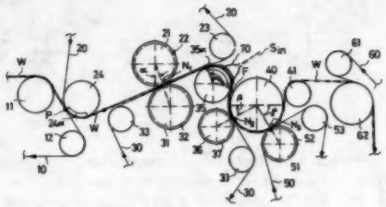
sealing off the axial ends of the belt with an end wall connected to the axial ends of the belt, said end walls being structured so that the belt flexes in the curvature of the plane of the roll beyond the lateral ends of the shoe and roll by offering substantially no resistance to the belt flexing in the roll plane while maintaining the integrity of the connection between the end wall and the belt.

4,673,462

PRESS SECTION OF A PAPER MACHINE

Jorma Laapotti, Jyväskylä , Finland, assignor to Valmet Oy, Helsinki, Finland

Division of Ser. No. 470,197, Feb. 28, 1983, Pat. No. 4,525,241.
This application Apr. 2, 1985, Ser. No. 702,627
Claims priority, application Finland, Mar. 5, 1982, 820776
The portion of the term of this patent subsequent to Jun. 25, 2002, has been disclaimed.
Int. Cl.[4] D21F 3/04, 9/00, 9/02
U.S. Cl. 162—301 11 Claims



1. In a paper machine including a forming section having a forming wire on which a web is dewatered in a first direction through the one of its two faces which contacts the forming wire, a closed press section following the forming section in the direction of travel of the web, comprising:

a first upper fabric on which a web from the forming wire of the wire section of the paper machine is carried, a first double-felted press nip constituted by two hollow-faced rolls through which said first upper fabric and web pass, a second lower fabric passing through said frist press nip which carries the web after said first press nip, the web being dewatered in said first press nip through both of its faces, a smooth-faced central roll constituting one roll of at least two single-felt nips, said second lower fabric extending to the smooth-face central roll so that the web is carried on said second lower fabric from said first press nip to said smooth-faced central roll and being detached from said second lower fabric asnd adhering to the face of said smooth-faced central roll to move therewith into a next one of said single-felt nips which is provided with its own press fabric, and wherein

said press section is devoid of any press rolls of the suction type, said hollow-faced rolls constituting said first double-felted press nip comprising solid-mantle hollow-faced rolls;

said second web-carrying lower fabric having a run prior to a first one of asid single-felt nips which is turned in a downward direction over a peripheral sector of a roll sitauted within a loop of said second lower fabric, said peripheral sector having a magnitude in the range of about 30° to 160° ; and

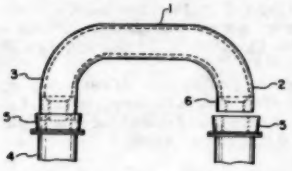
wherein the web passes through said first double-felted press nip and said at least two single-felt nips so that the face of the web which did not contact the forming wire of the wire section contacts the smooth face of said central roll in said at least two single-felt press nips and so that the web is dewatered in said at least one single felt nips in said first direction through said one of the web faces which contacts the forming wire in the forming section.

4,673,463

METHOD FOR EXTRACTING CHARGING GASES IN COKE OVEN CHAMBERS

Hans-Jurgen Kwasuik, Herne, and Hans-Gunter Piduch, Bochum, both of Fed. Rep. of Germany, assignors to C. Otto & Comp. G.m.b.H., Bochum, Fed. Rep. of Germany

Continuation of Ser. No. 643,495, Aug. 23, 1984, abandoned.
This application Feb. 4, 1986, Ser. No. 825,864
Claims priority, application Fed. Rep. of Germany, Sep. 3, 1983, 3331849
Int. Cl.[4] C10B *57/00, 27/04*
U.S. Cl. 201—41 13 Claims



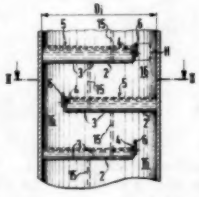
1. A method for exhausting from coke ovens gases and dust evolved during charging, comprising the steps of placing one end of a generally U-shaped conduit in an opening in the roof of a first oven to be charged, placing the other end of the U-shaped conduit in an opening in the roof of a second nearby oven, providing seals around said roof openings whereby said opposite ends of the U-shaped conduit extend into and are sealed gas-tight by said seals, charging coal into said first oven while permitting gases to flow from the first oven to the second oven through said conduit, and after charging has been completed providing a communication between the one end of the conduit and the atmosphere without disturbing the gas-tight seal between the other end of the conduit and its associated oven in a manner such that ignition of gas and air in the conduit is avoided by a high gas flow velocity therewithin, thus preventing explosions of residual gas within the conduit while lifting said ends from their associated roof openings thereafter.

4,673,464

DISTILLATION AND ABSORPTION COLUMN TRAYS

Karl J. Zeitsch, Cologne, Fed. Rep. of Germany, assignor to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Fed. Rep. of Germany

Filed Dec. 18, 1984, Ser. No. 682,919
Claims priority, application Fed. Rep. of Germany, Dec. 23, 1983, 3346740
Int. Cl.[4] B01D *3/22*
U.S. Cl. 202—158 13 Claims



1. A liquid containing tray for use in distillation columns, absorption columns and like apparatus, comprising a bottom wall having circular apertures and a characteristic frequency of vibration which satisfies the equation

$$f_\beta = \frac{3n}{2}\sqrt{\frac{2\sigma}{\rho_L R^3}}$$

wherein n is a whole number including one, σ is the surface tension of the body of liquid contained on the tray at the operating temperature of the column, ρ_L is the density of such liquid at the operating temperature of the column and R is the radius of apertures in said bottom wall.

4,673,465

SEPARATION OF M-XYLENE FROM O-XYLENE BY EXTRACTIVE DISTILLATION WITH POLYCHLORO COMPOUNDS

Lloyd Berg, and An-I Yeh, both of 1314 S. Third Ave., Bozeman, Mont. 59715

Filed Apr. 21, 1986, Ser. No. 854,424
Int. Cl.[4] B01D *3/40*; C07C *7/08*
U.S. Cl. 203—51 7 Claims

1. A method for recovering m-xylene from a mixture of m-xylene and o-xylene which comprises distilling a mixture of m-xylene and o-xylene in a rectification column in the presence of about one part of an extractive agent per part of m-xylene-o-xylene mixture, recovering m-xylene as overhead product and obtaining the extractive agent and o-xylene from the stillpot, the extractive agent comprises a mixture of aromatic chloro compounds at least one of which contains at least three chlorine atoms.

4,673,466

SEPARATION OF N-HEXYL ALCOHOL FROM N-HEXYL ACETATE BY EXTRACTIVE DISTILLATION

Lloyd Berg, 1314 S. Third Ave., Bozeman, Mont. 59715

Filed Jan. 27, 1986, Ser. No. 822,602
The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.
Int. Cl.[4] B01D *3/40*; C07C *29/84*
U.S. Cl. 203—51 8 Claims

1. A method for recovering n-hexyl alcohol from a mixture of n-hexyl acetate, n-hexyl alcohol and water which comprises distilling a mixture of n-hexyl acetate, n-hexyl alcohol and water in a rectification column in the presence of about one part of an extractive agent per part of n-hexyl acetate-n-hexyl alcohol-water mixture, recovering n-hexyl alcohol and water as overhead product and obtaining the n-hexyl acetate and the extractive agent from the stillpot, the extractive agent comprises a benzoate containing from eight to fourteen carbon atoms.

4,673,467

METHOD OF MANUFACTURING FINE-GRAINED COPPER SUBSTRATE FOR OPTICAL INFORMATION CARRIER

Hanphire H. Nee, Stamford, Conn., assignor to CBS Inc., New York, N.Y.

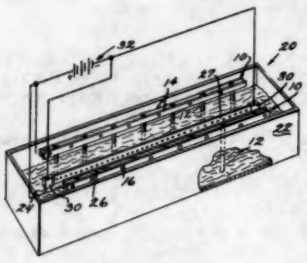
Filed Sep. 2, 1986, Ser. No. 902,845
Int. Cl.[4] C25D *3/38, 7/00*
U.S. Cl. 204—23 6 Claims

1. A method of depositing on a disc-shaped substrate a layer of copper for mastering an optical storage disc comprising the steps of placing the substrate in an electroplating bath comprising from about 180 to about 220 grams/liter of copper sulfate pentahydrate, from about 40 to about 80 grams/liter of sulfuric acid, from about 30 to about 60 part per million of chloride ion, from about 1.0 to about 15 grams/liter of polyether having a molecular weight from about 4000 to about 10,000, from about 3.5 to about 30.0 milligrams/liter of 1-lower alkyl-2-mercapto-imidazole, and from about 1 to about 100 milligrams/liter of sulfonated, sulfurized benzene compound; and passing electric current through the bath.

4,673,468
COMMERCIAL NICKEL PHOSPHORUS ELECTROPLATING

Nancy E. Myers, Kettering; Rodger L. Gamblin, Dayton, and David J. Sugg, Kettering, all of Ohio, assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed May 9, 1985, Ser. No. 732,277
Int. Cl.[4] C25D *3/58*
U.S. Cl. 204—24 **46 Claims**



1. A method of electrolytically plating a nickel and/or cobalt phosphorus alloy on a substrate, utilizing a bath which includes a major amount of phosphorous acid and a minor amount of phosphoric acid, comprising the steps of:

(a) immersing a substrate as a cathode in the bath;

(b) immersing an anode in the bath; and

(c) applying an electrical potential across the anode and cathode so as to effect electrodeposition of a nickel and/or cobalt phosphorus alloy on the substrate, while retaining the anode current density high enough so as to essentially prevent the buildup of phosphoric acid in the bath and thereby significantly increase bath life.

4,673,469
METHOD OF PLATING PLASTICS

Sidney C. Beach, Parma, and Jack D. Fellman, Brunswick, both of Ohio, assignors to McGean-Rohco, Inc., Cleveland, Ohio

Continuation of Ser. No. 619,681, Jun. 8, 1984, abandoned, which is a continuation of Ser. No. 345,316, Feb. 3, 1982, abandoned, which is a continuation of Ser. No. 112,347, Jan. 15, 1980, abandoned. This application Jul. 17, 1985, Ser. No. 755,961
Int. Cl.[4] C25D *5/10*
U.S. Cl. 204—38.4 **9 Claims**

1. A method for electrodepositing a thin, conductive layer of copper strike on a plastic substrate while avoiding burn-off so as to render it suitable to receive a continuous covering layer of electrolytically deposited copper which method comprises:

electrolessly depositing a thin layer of a metal selected from the group consisting of copper, nickel, cobalt and mixtures thereof on a surface of the plastic substrate;

positioning the plastic substrate on a supporting member, with the supporting member being in contact at a plurality of spaced apart electrical contact points with the substrate for the passage of electrical current therebetween;

immersing the substrate and its support in a copper strike bath in a manner such that all of said electrical contact points formed between said supporting member and said substrate are immersed in said bath, with said bath including from about 10.0 to about 45.0 g/l of copper ions, at least one acid selected from the group consisting of sulfuric acid, fluoroboric acid and sulfamic acid, with the acid being present in an amount sufficient to cause the electroplating bath to have a conductivity ranging from about 0.40 to about 0.60 mhos, and from about 30 to about 105 mg/l of chloride ions; and

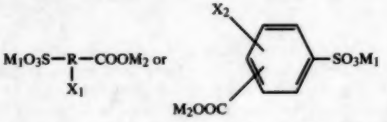
passing electrical current through the supporting member and the strike bath while said electrical contact points are immersed in said bath so as to cause a strike layer of copper to be electrolytically deposited over the layer of electrolessly deposited metal.

4,673,470
TIN, LEAD, OR TIN-LEAD ALLOY PLATING BATH

Keigo Obata, 1-4 Tsukimiyamahonmachi 1-chome, Suma-ku, Kobe-shi, Hyogo-ken; Nobuyasu Dohi, 8-1 Koriki-cho, Himeji-shi, Hyogo-ken; Yoshiaki Okuhama, Kobe; Seishi Masaki, Kobe; Yukiyoshi Okada, Kobe, and Masakazu Yoshimoto, Kobe, all of Japan, assignors to Keigo Obata, Nobuyasu Dohi; Daiwa Fine Chemicals Co., Ltd. and Ishihara Chemical Co., Ltd. all of Hyogo, Japan

Filed Feb. 21, 1986, Ser. No. 831,762
Claims priority, application Japan, Feb. 22, 1985, 60-32746
Int. Cl.[4] C25D *3/32, 3/36, 3/56, 3/60*
U.S. Cl. 204—44.4 **10 Claims**

1. A tin, lead, or tin-lead alloy plating bath comprising, as essential ingredients, 0.01 to 10 moles per liter of the plating bath of an alkali metal salt of an aliphatic or aromatic sulfocarboxylic acid of the general formula

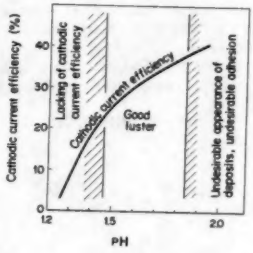


wherein R is a C_{1-4} hydrocarbon radical, M_1 is a hydrogen atom or alkali metal atom, M_2 is an alkali metal atom, and X_1 and X_2 are each a hydrogen atom, OH, COOZ, or SO_3Z, Z being a hydrogen atom or alkali metal atom; and a soluble divalent tin compound and/or a soluble divalent lead compound; said bath having a pH of from 3–8.5.

4,673,471
METHOD OF ELECTRODEPOSITING A CHROMIUM ALLOY DEPOSIT

Hiroshi Kagechika, Yokohama; Akira Tonouchi, Tokyo, both of Japan, and Roland Kammel, Berlin, Fed. Rep. of Germany, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 827,472, Feb. 5, 1986, abandoned, which is a continuation of Ser. No. 735,785, May 20, 1985, abandoned. This application Nov. 3, 1986, Ser. No. 925,965
Claims priority, application Japan, Aug. 27, 1984, 59-176759
Int. Cl.[4] C25D *3/56*
U.S. Cl. 204—44.5 **3 Claims**



1. A method of electrodepositing a chromium alloy plate which comprises electrolyzing an aqueous bath consisting of a chromium salt providing from 1.5 to 2.0 mol/liter of trivalent and divalent ions, alkali salt providing from 1.5 to 2.5 mol/liter of an ion selected from the group consisting of potassium ion, sodium ion and ammonium ion, and a salt of alloying metal providing not less than 0.6 mol/liter of an ion selected from the group consisting of iron, nickel and cobalt; wherein said bath is maintained at a temperature between 30° to 80° C., said bath is

maintained at a pH of between 1.5 and 1.8, and said bath is subjected to a current density of between 10 to 80 A/dm^2.

4,673,472

METHOD AND ELECTROPLATING SOLUTION FOR DEPOSITION OF PALLADIUM OR ALLOYS THEREOF

Ronald J. Morrissey, Cranston, and Harry Kroll, East Greenwich, both of R.I., assignors to Technic Inc., Providence, R.I.

Filed Feb. 28, 1986, Ser. No. 834,525
Int. Cl.[4] C25D 3/52
U.S. Cl. 204—44.6 22 Claims

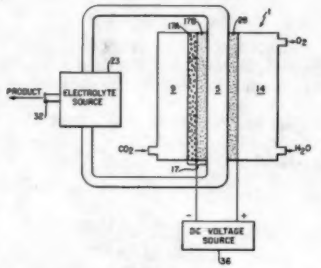
1. An electroplating solution for the deposition of palladium or of alloys thereof, having a pH between about 1.5 and 4.0, and containing palladium in the form of a reaction product formed from palladium diaminodinitrite with an acid in the presence of a scavenging agent for nitrite, said acid being selected from the group consisting of sulfamic, sulfuric, methane sulfonic, fluoroboric and nitric.

4,673,473

MEANS AND METHOD FOR REDUCING CARBON DIOXIDE TO A PRODUCT

Peter G. P. Ang, and Anthony F. Sammells, both of Naperville, Ill., assignors to Peter G. PA Ang, Naperville, Ill.

Filed Jun. 6, 1985, Ser. No. 741,780
Int. Cl.[4] C25B 3/00
U.S. Cl. 204—59 R 56 Claims



27. A method for reducing carbon dioxide to a product comprising the steps of:

providing carbon dioxide to a catholyte chamber of a reaction cell,

providing water to an anolyte section of the reaction cell,

forming a passageway through the reaction cell with a dual porosity cathode between said passageway and said catholyte chamber and with a porous anode between said passageway and said anolyte chamber,

providing an electrolyte in a manner so that it passes through said passageway, and

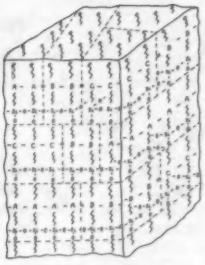
providing a direct current voltage across said dual porosity cathode and said anode so as to cause a reduction of the carbon dioxide in cooperation with the electrolyte and hydrogen ions passing through the anode, to a product contained within the electrolyte and to cause oxygen to be emitted from the anolyte chamber.

4,673,474

MOLECULAR CONTROLLED STRUCTURE AND METHOD OF PRODUCING THE SAME

Kazufumi Ogawa, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 15, 1985, Ser. No. 787,368
Claims priority, application Japan, Oct. 16, 1984, 59-216649
Int. Cl.[4] B01J 19/12
U.S. Cl. 204—157.64 7 Claims



4. A method of producing a molecular controlled three-dimensional structure comprising:

forming a first layer on a substrate, said first layer including a plurality of normal chain hydrocarbon molecules, each molecule having at one end thereof, an energy responsive group and having at the other end thereof a reaction group,

forming a second layer made up of molecules having at one end an energy responsive group and at the other end a reaction group on a first portion of said first layer by irradiating said first layer with energy beams to activate the energy responsive group of said first layer whereby the reaction groups of the second layer react with the responsive groups of said first layer or induced groups from said responsive groups of the first layer to form said second layer on the first layer; and,

forming a third layer made up of molecules having at one end an energy responsive group and at the other end a reaction group on a second portion of said first layer by irradiating the second portion of the first layer with energy beams so that the reaction groups of the third layer react with the responsive groups of the first layer or induced groups from said responsive groups to form the third layer on the second portion of the first layer, said second portion of the first layer being different than the first portion of the first layer.

4,673,475

DUAL ION BEAM DEPOSITION OF DENSE FILMS

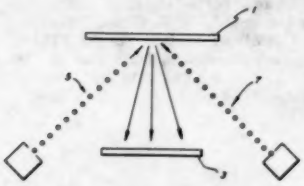
Henry Windischmann, Solon, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

Filed Jun. 28, 1985, Ser. No. 749,833
Int. Cl.[4] C23C 14/46
U.S. Cl. 204—192.11 6 Claims

1. A process for depositing a hydrogenated amorphous silicon film on a substrate comprising:

simultaneously directing a first beam of ions effective in sputtering and a second beam of hydrogen ions against a

silicon target, said hydrogen ions having energies not exceeding about 20 electron volts, and collecting on said



substrate the product of said beams as a film of hydrogenated amorphous silicon.

4,673,476

ANTIREFLECTIVE FILM FOR PHOTOELECTRIC DEVICES AND MANUFACTURING METHOD THEREOF

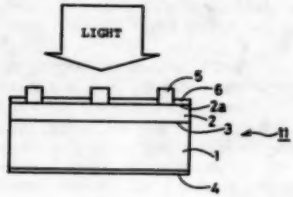
Kotaro Mitsui; Mari Kato; Takao Oda, and Susumu Yoshida, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 705,117, Feb. 22, 1985, Pat. No. 4,649,088. This application Oct. 21, 1986, Ser. No. 921,149

Claims priority, application Japan, Apr. 2, 1984, 59-66891

Int. Cl.[4] C23C *14/00*

U.S. Cl. 204—192.28 **2 Claims**



1. A method of manufacturing an antireflective film on the light receiving surface or the light emitting surface of a photoelectric device, comprising the steps of:

setting said photoelectric device in a chamber of a sputtering device,

introducing an inert gas and an active gas containing nitrogen into said chamber to start reactive sputtering with tantalum, tantalum oxide, aluminum, aluminum oxide or silicon as a target to be sputtered,

performing reactive sputtering for a prescribed period of time while increasingly adding a reactive gas containing oxygen into said chamber, and

subsequently performing reactive sputtering for a prescribed period of time while decreasing said reactive gas containing nitrogen in said chamber.

4,673,477

CONTROLLED VACUUM ARC MATERIAL DEPOSITION, METHOD AND APPARATUS

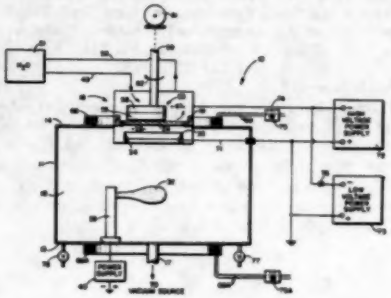
Subbiah Ramalingam, Roseville, Minn.; Cai B. Qi, Beijing, China, and Kyunghoon Kim, St. Paul, Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.

Continuation of Ser. No. 585,845, Mar. 2, 1984, abandoned. This application Feb. 4, 1986, Ser. No. 825,958

Int. Cl.[4] C23C *14/22*

U.S. Cl. 204—192.38 **25 Claims**

1. An apparatus for applying material by vacuum arc deposition to an object comprising: housing means having a vacuum chamber accommodating the object, means for maintaining a vacuum in said chamber, at least one material deposition head attached to the housing means, a cathode mounted on said head, said cathode having an active surface in said vacuum chamber, anode means located in said vacuum chamber, means for generating and sustaining an electric arc between the active surface and said anode means, the material of said active surface being vaporized by said electric arc and deposited on said object forming a coating thereon, magnet means forming opposite magnetic poles with both poles located adjacent said cathode and in registry therewith on a side of the cathode opposite from the active surface, one of said poles comprising a central magnet and the other pole comprising a peripheral



wall surrounding the central magnet to establish a magnetic field having an outer periphery and extending inwardly toward the central magnet, the magnetic field passing through the cathode and having portions generally parallel to the cathode, the poles being spaced apart in direction along the active surface, to control and direct the path of movement of said arc along a defined closed arc track on the active surface of the cathode, and means movably mounting the magnet means on the head means operable to move the magnet means relative to the cathode whereby the defined arc track sweeps across at least portions of the active surface of the cathode.

4,673,478

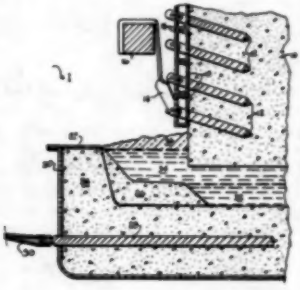
ALUMINA REDUCTION CELL

Alton T. Tabereaux, Sheffield, Ala., and Frank L. Gunsip, Massena, N.J., assignors to Reynolds Metals Company, Richmond, Va.

Filed Jul. 28, 1986, Ser. No. 890,203

Int. Cl.[4] C25C *3/16*

U.S. Cl. 204—243 R **5 Claims**



1. In an alumina reduction cell having a cathode and an anode, said anode being formed of a carbonaceous paste and baked during operation of said cell and said anode having rows of anode pins on opposing faces thereof, said pins being positioned by passing said pins through openings in anode channels

vertically stacked along said opposing faces of said anode, the lowermost row of said anode pins carrying current through said anode, the improvement wherein said anode channels are each constructed and arranged to position said anode pins passing therethrough along a line of constant current distribution in said anode.

4,673,479

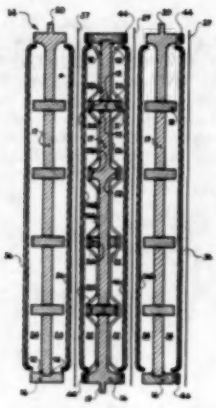
FABRICATED ELECTROCHEMICAL CELL

Gregory J. E. Morris, Lake Jackson; Sandor Grosshandler, Houston; Richard N. Beaver, Angleton; John R. Pimlott, Sweeny, and Hiep D. Dang, Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 472,792, Mar. 7, 1983, Pat. No. 4,488,946. This application Dec. 17, 1984, Ser. No. 682,735

Int. Cl.[4] C25B *1/26*

U.S. Cl. 204—279 **19 Claims**



1. A method for making an electrolytic unit having
a substantially planar central support element;
a plurality of bosses on each side of the central support element projecting outwardly from and contacting the central support element; and
a peripheral flange structure composed of at least one piece and having an internal surface which sealably receives all external peripheral edges of the central support element;
said method comprising:
(a) forming a unitized, planar subassembly of the central support element and at least a portion of the peripheral flange structures;
(b) attaching any remaining peripheral flange structures to complete the peripheral flange structure desired for at least one side of the central support element;
(c) completing, as required, the assembly of the electrolytic unit by attaching any elements remaining in the group consisting of peripheral flange structures and any remaining bosses desired on the opposing side of the central support element;
(d) covering at least a portion of at least one of the boss-containing sides of the central support element with a metal liner composed of one or more pieces; and
(e) attaching said metal liner(s) to at least a portion of the bosses contacting the metal liner by welding or diffusion bonding.

4,673,480

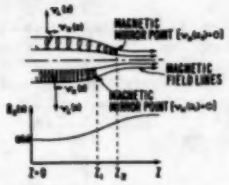
MAGNETICALLY ENHANCED SPUTTER SOURCE

Lawrence T. Lamont, Jr., Mountain View, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Division of Ser. No. 150,532, May 16, 1980, Pat. No. 4,457,825. This application Jan. 30, 1984, Ser. No. 575,111

Int. Cl.[4] C23C *14/36*

U.S. Cl. 204—298 **24 Claims**



1. Glow discharge sputter coating apparatus comprising:
cathode means including an annular sputter target having a surface from which material is to be sputtered and an inner and an outer rim each intersecting said sputter surface;
a magnetic system including magnetic poles, said poles comprising an inner pole adjacent said inner rim of the target, and an outer pole adjacent said outer rim of the target, said poles being of opposite magnetic polarity for producing a magnetic field comprising field lines which pass from the inner pole over the adjacent portion of said sputter surface without first intersecting said sputter surface and then intersect said sputter surface toward the outer pole;
said inner magnetic pole being electrically insulated from said cathode means whereby said inner magnetic pole can be operated at positive potential relative to said cathode means; and
the configuration and location of said magnetic poles being such that the magnetic field intensity increases toward said inner pole from a region between said poles to form a magnetic mirror to confine electrons in the magnetic field adjacent said inner pole in an amount sufficient to provide said glow discharge when said inner pole is at a positive potential with respect to said cathode means.

4,673,481

REDUCTION POT

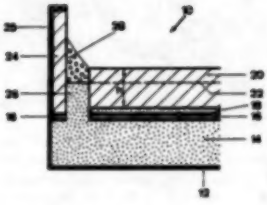
Wilhelm Scharpey, Essen, Fed. Rep. of Germany, assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Feb. 11, 1986, Ser. No. 828,294

Claims priority, application Switzerland, Feb. 15, 1985, 720/85

Int. Cl.[4] C25C *3/08*

U.S. Cl. 204—243 R **11 Claims**



1. Reduction pot for the production of aluminum by fused salt electrolysis, comprising: an outer steel shell having a floor and sidewalls; an inner lining essentially of carbon with iron cathode bars; floor insulation comprising at least in part of a mechanically compacted layer of a granular material made from ground insulation layers and having a particle size that

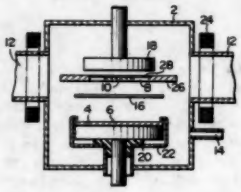
varies essentially between 0.01 and 8 mm; wherein the sidewalls contain at most up to 70% of the height (h) of the cathode bars of mechanically compacted, granulated material from insulation layers and sidewall bricks lining the steel shell extending above the sidewall granulated material and forming a gap between the sidewall bricks and carbon floor elements; and a ramming mass closing said gap.

4,673,482

SPUTTERING APPARATUS

Eiji Setoyama; Keiji Arimatsu, and Youichi Ohshita, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 25, 1986, Ser. No. 911,421
Claims priority, application Japan, Sep. 26, 1985, 60-212976
Int. Cl.[4] C23C *14/00*
U.S. Cl. 204—298 **7 Claims**



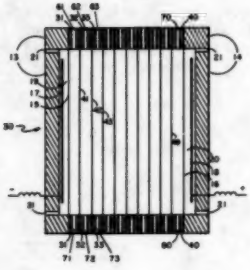
1. A sputtering apparatus comprising:
at least one pair of magnetic field-generating sources;
a substrate disposed within said magnetic field-generating sources;
a target disposed opposite to said substrate; and
a magnetic thin plate disposed at a side of said substrate which is remote from said target so that a uniform magnetic field is generated on the surface of said substrate.

4,673,483

ISOELECTRIC FOCUSING APPARATUS

Robert J. Mandle, Lexington, Mass., assignor to Ionics Incorporated, Watertown, Mass.

Filed Mar. 20, 1986, Ser. No. 842,100
Int. Cl.[4] B01D *13/02*
U.S. Cl. 204—301 **7 Claims**



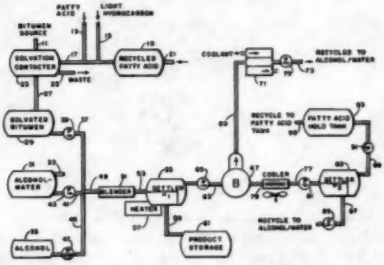
1. In an apparatus for isoelectric focusing, comprising, in combination: an enclosure having a plurality of inlet ports and a plurality of associated outlet ports opposing said ports; a plurality of recirculation paths, each coupling an outlet port to a respective inlet port; a liquid within said enclosure and said recirculating paths, said liquid containing buffering components capable of establishing a pH gradient in a direct current electric field; inlet and outlet separator means for respectively separating the flow of liquid which enters at said inlet ports and exist at said outlet ports; a plurality of streamlining membranes disposed between respective ones of said inlet and outlet separator means and oriented generally parallel to the direction of flow of said liquid so as to streamline the flow of liquid as between said inlet and outlet separator means while allowing interchange of liquid constituents therebetween; means for applying a direct current electrical potential transverse the direction of flow of said liquid in said enclosure to establish a gradient of pH steps as between successive channels defined by said membranes; pumping means for pumping the liquid in said recirculation paths for cooling the liquid therein; the improvement comprising a plurality of reservoirs, each connected to a said recirculating path, with each of said reservoir and its respective recirculating path sealed to the atmosphere thereby minimizing any change in the liquid volume of said reservoir, its respective recirculating path and respective channel.

4,673,484

AMPHIPHILIC PHASE BEHAVIOR SEPARATION OF CARBOXYLIC ACIDS/HYDROCARBON MIXTURES IN RECOVERY OF OIL FROM TAR SANDS OR THE LIKE

Robert E. Babcock, Fayetteville, Ark.; W. Hardey Beaver, and F. Dianne Wood, both of Baton Rouge, La., assignors to Diversified Petroleum Recovery, Inc., Little Rock, Ark.

Filed Nov. 19, 1986, Ser. No. 932,588
Int. Cl.[4] E21B *43/40*
U.S. Cl. 208—435 **41 Claims**



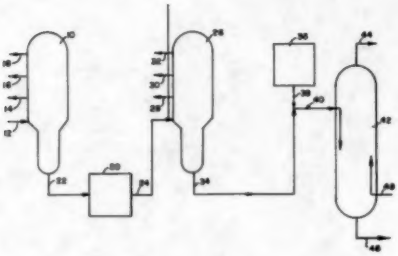
1. A method for recovering crude oil from fossil fuel deposits of heavy oil or bitumen comprising the steps of:
(a) exposing an admixture containing at least one carboxylic acid to a viscous or solid crude oil source material;
(b) intimately contacting said carboxylic acid admixture with respect to the source material to produce a solvated crude oil mixture of reduced viscosity;
(c) blending the solvated crude oil mixture with an alcohol-water solution to produce an amphiphilic phase separation of the resulting mixture;
(d) gravity separating the resulting mixture in a settling chamber by extracting an alcohol-water-acid phase from the top of said chamber;
(e) distilling said alcohol-water-acid phase to at least partially separate said carboxylic acid from said alcohol-water solution;
(f) further gravity separating the acid component output from said distilling step to produce recovered carboxylic acid with reduced water and alcohol content;
(g) recycling the recovered carboxylic acid into step (a); and
(h) recycling recovered alcohol-water solution into step (c).

4,673,485

PROCESS FOR INCREASING DEASPHALTED OIL PRODUCTION FROM UPGRADED RESIDUA

Duncan J. Bristow; Biddanda U. Achia, both of Sarnia, and Lawrence J. Evers, Brights Grove, all of Canada, assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Apr. 6, 1984, Ser. No. 597,437
Int. Cl.[4] C10C *3/00*; C10G *1/00, 1/04*
U.S. Cl. 208—86 4 Claims



1. A process for increasing the production of deasphalted oil from a hydrocarbon feedstock comprising the steps of:

(a) passing the hydrocarbon feedstock into a first distillation zone wherein the feedstock is separated into distillates and a first residuum;

(b) passing said first residuum into a hydrotreating zone operating between about 315° C. to 425° C., at an absolute pressure between 4000 to 10,000 cmHg wherein a hydrotreated first residuum is produced;

(c) passing said hydrotreated first residuum into a second distillation zone wherein it is separated into distillates and a hydrotreated distillation residuum; and

(d) mixing said hydrotreated distillation residuum with a solubilizing aid selected from the group consisting of catalytic cracker fractionator bottoms having an initial boiling point not less than 260° C. and not more than 430° C. (at 1 atmosphere), heavy cycle gas oil having a boiling point range of 200° C. to 420° C. (at 1 atmosphere) and heavy coker gas oil having a boiling point range of 300° C. to 550° C. (at 1 atmosphere) and feeding the resultant mixture into a deasphalting zone wherein said solubilizing aid comprises 30 to 60 LV% of the total feed to the deasphalting zone wherein the hydrotreated distillation residuum and solubilizing aid are contacted with a deasphalting solvent producing a liquid deasphalted oil extract and an asphaltic raffinate, wherein said solubilizing aid inhibits the formation of a third asphaltic phase by promoting the solubility of said third phase in said asphaltic raffinate.

4,673,486

PROCESS FOR THERMAL CRACKING OF RESIDUAL OILS

Tadaaki Orihashi; Hiroshi Tsuji; Kazuhiko Ogawa; Masao Hayashitani; Seiji Terada, all of Kobe; Tsuglo Miyagawa, Toke, and Hideo Isozaki, Yachiyo, all of Japan, assignors to Jushitsuyu Taisaku Gijutsu Kenkyu Kumiai, Tokyo, Japan

Filed Sep. 26, 1984, Ser. No. 654,506
Claims priority, application Japan, Sep. 30, 1983, 58-183261
Int. Cl.[1] C10C *3/08*; C10G *55/04*
U.S. Cl. 208—86 14 Claims

1. A process for the thermal cracking of an extraction residue from a solvent deasphalting process, which comprises:

providing said extraction residue by solvent extraction of a petroleum hydrocarbon residual oil with a solvent selected from the group consisting of butane, pentane, hexane, and mixtures thereof under conditions such that the extraction residue contains at least about 40% asphaltenes or pentane-insolubles, and

subjecting said extraction residue to thermal cracking by a method consisting essentially of the following steps:

(a) commingling said extraction residue with a carrier gas;

(b) passing the resultant fluid mixture through a tubular thermal cracking zone at thermal cracking conditions, including a temperature of from about 400° C. to about 600° C. and a residence time not more than about 8 minutes to effect thermal cracking of said extraction residue;

(c) regulating the amount of said carrier gas to provide a flow velocity of said fluid mixture at the inlet of said tubular thermal cracking zone of from about 0.5 to about 4.0 m/sec, providing heat input to said tubular thermal cracking zone such that the heat flux is from about 5,000 to about 40,000 kcal/m^2hr, and maintaining a temperature difference between the outside surface of said tubular thermal cracking zone and the fluid mixture flowing therethrough of less than about 100° C., whereby to minimize or avoid coking in said cracking zone; and

(d) separating and recovering cracked oil and pitch from the effluent reaction products from said thermal cracking zone, the wt.% yield of cracked oil being substantially less than the wt.% yield of pitch.

4,673,487

HYDROGENATION OF A HYDROCRACKATE USING A HYDROFINISHING CATALYST COMPRISING PALLADIUM

Stephen J. Miller, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 671,139, Nov. 13, 1984, Pat. No. 4,601,996.
This application Feb. 6, 1986, Ser. No. 826,941
Int. Cl.[4] C10G *47/14, 65/12*
U.S. Cl. 208—58 6 Claims

1. In a process for stabilizing lubricating oil which comprises the steps of:

(a) hydrocracking in a hydrocracking zone a hydrocarbonaceous feedstock; and

(b) catalytically hydrogenating in a catalytic hydrogenation zone at least part of the effluent of said hydrocracking zone by contacting at least part of said hydrocracking zone effluent with a catalyst comprising nickel or compounds thereof, tin or compounds thereof, and a siliceous matrix;

the improvement which comprises adding to said catalyst from about 0.03 percent by weight to about 1.0 percent by weight of palladium metal as a percentage of total catalyst weight.

4,673,488

HYDROCARBON-CONVERSION PROCESS WITH FRACTIONATOR OVERHEAD VAPOR RECYCLE

Robert B. Turner, Schaumburg; Kenneth D. Peters, Elmhurst, and Richard W. Bennett, Western Springs, all of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Aug. 26, 1985, Ser. No. 769,091
Int. Cl.[4] C10G *47/00*
U.S. Cl. 208—101 12 Claims

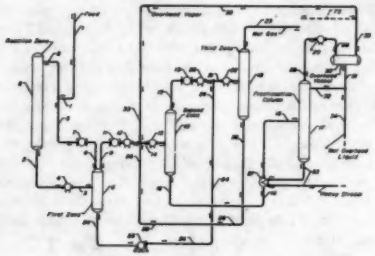
1. In a process for recovering the products of a hydrogen-producing hydrocarbon conversion reaction the improvement which comprises:

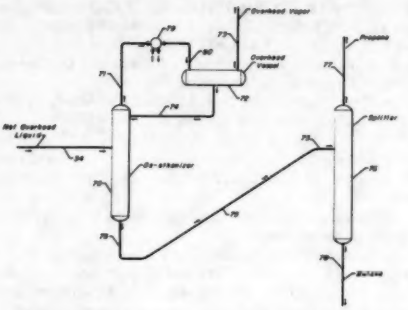
(a) passing a partially condensed hydrocarbon conversion reaction zone effluent stream comprising C_5+ hydrocarbons, methane, ethane, propane, butane, and hydrogen into a vapor-liquid separation zone which comprises at least two vapor-liquid separators and in which at least one vapor-liquid contacting step is performed whereby said effluent stream is separated into a hydrogen-rich net gas stream and a liquid stream, said reaction zone effluent stream being initially passed to a first vapor-liquid separator in said vapor-liquid separation zone to yield a first

hydrogen-containing vapor stream and a first liquid stream and at least a portion of said hydrogen-containing vapor stream being passed to a second vapor-liquid separator in said vapor-liquid separation zone to yield a second hydrogen-containing vapor stream and a second liquid stream;

(b) passing the liquid stream to a fractionation column and recovering therefrom a heavy hydrocarbon stream, an overhead vapor stream, and an overhead liquid stream;

(c) passing at least a portion of the overhead vapor stream





directly to the second of said vapor-liquid separators in said vapor-liquid separation zone;

(d) passing said overhead liquid stream to a de-ethanizer column and recovering therefrom an overhead vapor stream and a bottoms stream;

(e) passing said bottoms stream to a splitter column and recovering therefrom an overhead propane stream and a butane stream; and

(f) recycling said overhead vapor stream from step (d) directly to the second of said vapor-liquid separators in said vapor-liquid separation zone.

4,673,489

METHOD FOR PREVENTION OF FOULING IN A BASIC SOLUTION BY ADDITION OF SPECIFIC NITROGEN COMPOUNDS

Paul V. Roling, Spring, Tex., assignor to Betz Laboratories, Inc., Trevose, Pa.

Filed Oct. 10, 1985, Ser. No. 786,274
Int. Cl.[4] C10G 9/12, 9/16
U.S. Cl. 208—289 **18 Claims**

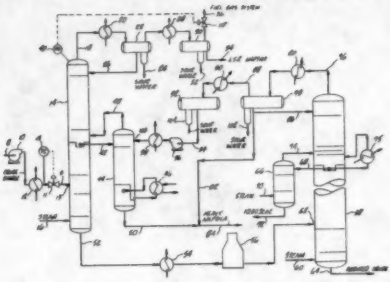
1. A method for inhibiting the formation and deposition of fouling materials during the basic washing of hydrocarbons contaminated with oxygenated compounds which comprises performing the wash of the hydrocarbon in the presence of sufficient amount for inhibiting the formation and deposition of fouling of hydroxylamine, of the formula NH_2OH or an acid salt or mixtures thereof.

4,673,490

PROCESS FOR SEPARATING CRUDE OIL COMPONENTS

Mahadevan Subramanian; Richard D. Monday; David B. Johnson, all of Houston, Tex., and Frank J. Kleinschrodt, Herring Cove, Canada, assignors to Fluor Corporation, Irvine, Calif.

Filed Aug. 23, 1985, Ser. No. 768,615
Int. Cl.[4] C10G 7/00; B01D 3/42
U.S. Cl. 208—354 **11 Claims**



1. A method of separating components of crude Oil comprising:

feeding heated crude Oil containing non-readily condensible components and LSR naptha and heavy naphtha components to a tower operating at a relatively high pressure and a relatively high temperature;

separating the crude Oil into an overhead stream, containing essentially all of the non-readily condensible components and essentially all of the LSR naphtha component, a bottoms stream and one or more side streams containing essentially all of the heavy naphtha component in the tower at the relatively nigh pressure and the relatively high temperature;

feeding said bottoms stream to an atmospheric crude distillation unit operating at relatively low pressure;

separating said bottoms stream into a crude distillation unit overhead stream, a crude distillation unit bottoms stream, and one or more crude distillation unit side streams;

collecting a sidestream from the tower at a sidestreams outlet;

feeding said sidestream to a stripper column;

feeding an overhead vapor from the stripper column to a side inlet of the tower;

collecting a bottoms stream from said stripper column as heavy naphtha;

feeding the bottoms stream from the tower to a means for heating so that the lighter components of said bottoms stream are vaporized prior to being fed to the crude distillation unit operating at relatively low pressure;

feeding said bottoms stream into said atmospheric crude distillation unit at a crude feed inlet located at a point above a steam feed inlet;

separating the bottoms stream from the tower into components in the atmospheric crude distillation unit;

collecting a reduced crude product as the crude distillation unit bottoms stream;

feeding the crude distillation unit overhead stream to a pair of condensing units connected in series wherein the second of said pair of condensing units is a total condensing unit and the first of said pair of condensing units is a partial condensing unit;

feeding at least part of a petroleum condensate from the first of said pair of condensing units to an overhead reflux inlet of the atmospheric crude tower;

collecting the remainder of the petroleum condensate from

the first of said pair of condensing units as a heavy naphtha product;

feeding the vapor from the first of said pair of condensing units to the second of said pair of condensing units; and

feeding a petroleum condensate from the second of said pair of condensing units to the stripper column.

4,673,491

PROCESS AND APPARATUS FOR THE CENTRIFUGAL SEPARATION OF FINE-GRAIN MINERAL MIXTURES

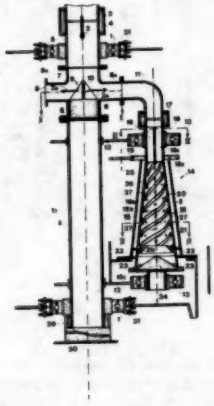
Walter Sedlaczek, Elizabeth Bay, Australia, assignor to Miset AG, Hünenberg, Switzerland

Filed Apr. 23, 1985, Ser. No. 726,400

Claims priority, application Switzerland, May 2, 1984, 2129/84

Int. Cl.[4] B03B *5/58;* **B04B** *5/02, 5/10*

U.S. Cl. 209—453 **17 Claims**



1. A process for winnowing a fine-grain mineral mixture into a heavy fraction and a light fraction using centrifugal force, said process comprising mixing the fine-grain mineral mixture with a fluid to form a fluid suspension of the fine-grain mineral mixture; continuously charging the fluid suspension coaxially in the direction of a central shaft which defines a main axis; dividing the continuously charged fluid suspension into several quantity-regulated partial material flows having equal volumes and equal proportions of fine-grain mineral mixture; conducting each partial material flow through a separation region which is located at a distance from said main axis and which is parallel thereto, each said separation region being defined by a rotationally symmetrical inner circumferential surface of a tube-type separating element, each tube-type separating element having a longitudinal rotation axis which is defined by said inner circumferential surface and is parallel to said main axis, each said separation region having a first section and a second section, each of the separating elements being rotatable about said main axis and individually about their longitudinal rotation axis; passing each partial material flow to the first section of the separation region of the associated separating element; rotating the partial material flow in the first section around said main axis and around the associated longitudinal rotation axis, said rotation about the longitudinal rotation axis occurring at approximately the same angular speed as the separating element rotates about its longitudinal rotation axis, in order to centrifically stratify the partial material flow, thus causing the heavy fraction of the fine-grain mineral mixture to accumulate radially outwardly on the inner surface and the light fraction to accumulate radially inwardly toward the longitudinal rotation axis, the stratification being due to the combined effect of the rotating movements of the separating element about the main axis and about its longitudinal rotation axis; then passing each stratified partial material flow into the adjoining second section of the separation region wherein the rotating movement of the stratified partial material flow is reduced; axially conveying the radially outward heavy fraction along the inner circumferential surface and axially conveying the light fraction and fluid towards the end of the separation region; splitting said stratified partial material flow; discharging the radially outward heavy fraction laterally outwardly through discharge openings in said inner circumferential surface; and discharging the radially inward light fraction and fluid from the end of separation region.

4,673,492

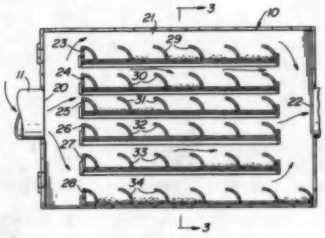
GOLD RECOVERY APPARATUS

Hubert C. Jasinski, 2nd & Garfield Aves., West Point, Pa. 19486

Filed Jun. 3, 1985, Ser. No. 740,499

Int. Cl.[4] B07B *3/00;* **B01D** *45/00*

U.S. Cl. 209—477 **8 Claims**



7. A method for separating gold from a gold-containing mixture of particles which comprises:

(1) combining said gold-containing mixture with air under vacuum to form a gaseous effluent;

(2) conveying said effluent to a non-oscillatory device consisting essentially of:

(a) a separation chamber having sidewalls and upper and lower walls;

(b) means defining an inlet port from which gold containing mixtures are impelled into said separation chamber under vacuum in the form of an effluent, said inlet port being centrally located in a front sidewall of said chamber;

(c) means defining an outlet port for carrying away from said chamber exhaust air and unwanted particulate matter, said outlet port being located in a rear sidewall of said chamber directly opposite said inlet port;

(d) vacuum means for conveying an effluent under vacuum into said inlet port and out of said outlet port;

(e) a stack of removable trays supported one above the other in said separation chamber, said stack of trays define a plurality of flow paths between said trays, each tray being equipped with a plurality of curved vane means which individually extend perpendicular to the line defined between the inlet port and the outlet port and which serve to divert the gold particles in said mixture onto said trays, said trays extending substantially across the width of the chamber and being longitudinally shorter than said chamber so as to define an open area between said front sidewall and said trays, and said rear sidewall and said trays, the trays located near the inlet and outlet ports being further positioned so as to be closer to each other than to the trays near the upper and lower walls;

(3) emitting the effluent into said separation chamber as a horizontal stream where it is brought into contact with said plurality of curved vane means which collectively are arranged serially on each tray in the direction of the efflu-

ent stream to interrupt the effluent and divert the gold particles onto removable trays; and

(4) collecting the gold deposit thus obtained.

4,673,493

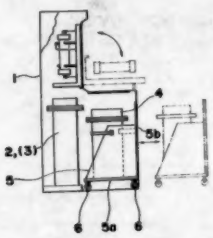
APPARATUS FOR SUPPLYING FILTERED LIQUID

Atsuki Wada, Uji; Mikio Takahashi, Suita, and Eiji Suhara, Neyagawa, all of Japan, assignors to Kurashiki Boseki Kabushiki Kaisha, Kurashiki, Japan

Filed Mar. 25, 1985, Ser. No. 715,347

Int. Cl.[4] B01D *21/30*

U.S. Cl. 210—98 9 Claims



1. An apparatus for continuously filtering liquid and supplying filtered liquid, comprising:

means for continuously filtering and for supplying filtered liquid including;

means for enabling liquid to be filtered, to be first transferred from a movable container to first tank and then to be repeatedly passed through the filtering means to a second tank and back again, sufficient to enable the movable container to be refilled while the liquid is filtered, said means of continuously filtering, further inlcluding,

a housing;

the first tank and a second tank which are fixedly placed within the housing;

the movable container which can be removably placed within the housing;

a discharge port located within said housing;

a means for selectively supplying compressed gas to said first tank, said second tank, and said movable container;

a first liquid passage between the movable container and the first tank;

a second liquid passage between the first tank and the second tank;

the filtering means provided within said second liquid passage; and

a third liquid passage between the discharge port and the second liquid passage.

4,673,494

WATER TREATMENT APPARATUS

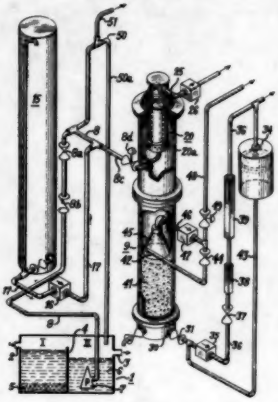
Milos Krofta, Lenox, Mass., assignor to Lenox Institute For Research, Inc., Lenox, Mass.

Continuation-in-part of Ser. No. 625,089, Jun. 27, 1984, abandoned. This application Aug. 30, 1985, Ser. No. 771,105

Int. Cl.[4] C02F *1/24*

U.S. Cl. 210—202 3 Claims

1. Apparatus for treatment of unclarified water comprising, in combination, an upwardly extending elongated main tank closed at top and bottom, conduit means for introducing unclarified water into said main tank, supply means connected to said conduit means for adding flocculating material to the unclarified water, said conduit means introducing the mixture of unclarified water and flocculating material into said main tank, means comprising electrolysis means in said main tank for electrolyzing the water therein for generating gaseous material in said main tank for floating flocculated material including attached contaminant particles in the water to the upper portion of said main tank, means at said upper tank portion for removing the floating flocculated material, first hood means closing said main tank at its top for containing the floating flocculated material, said means for removing the latter material comprising pump means communicating with the interior of said first hood means for discharging the flocculated material collected therein, filter means at the bottom portion of said main tank for removing downwardly flowing flocculated material, said filter means comprising porous material having a surface on which said downwardly flowing flocculated material is deposited, means for cleaning the surface of said filter means comprising backwash means for lifting off said deposited flocculated material and means for removing and disposing of the latter material, said backwash means comprising clarified water collecting means connected to said main tank for introducing clarified water into said filter means, said means for removing and disposing of said deposited flocculated material comprising second hood means arranged in said main tank closely above said filter means for receiving the flocculated material, a discharge pump connected to said second hood means, and discharge pipe means connected to said discharge pump for disposing of said deposited flocculated material, said electrolysis means arranged between said first and second hood means, and clarified water discharge means for removing the thus clarified water.



4,673,495

ENCLOSED CYCLONE SEPARATORS

Noel Carroll, Sherbrooke Road, Sherbrooke, Victoria, and Collin J. Phelps, Fountain Gate, both of Australia, assignors to Noel Carroll, Sherbrooke, Australia

PCT No. PCT/AU84/00156, § 371 Date Mar. 28, 1985, § 102(e) Date Mar. 28, 1985, PCT Pub. No. WO85/00759, PCT Pub. Date Feb. 28, 1985

PCT Filed Aug. 10, 1984, Ser. No. 719,517

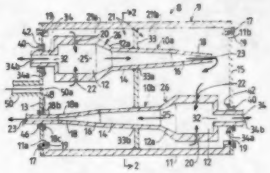
Claims priority, application Australia, Aug. 11, 1983, PG0780; May 8, 1984, PG4888

Int. Cl.[4] B04C *5/00*

U.S. Cl. 210—232 9 Claims

1. A liquid separator apparatus comprising a plurality of cyclone separators arranged for separating a liquid mixture into two components thereof, and a substantially closed housing with said plurality of cyclone separators mounted within the interior thereof, each cyclone separator having means defining a feed inlet, means defining an overflow outlet for discharge of the less dense of said liquid components and means defining an underflow outlet for the denser of said liquid mixture components, said feed inlet to at least one of said

cyclone separators being open to a partitioned chamber defined by the interior of said housing, the housing being provided with housing inlet means for inflow of liquid to be separated into said housing, the liquid separator apparatus being provided with first outlet means comprising the overflow outlets of the cyclone separators communicating with the exterior of said housing, and second outlet means comprising the underflow outlet of one separator communicating with the exterior of the housing, wherein said chamber is partitioned to



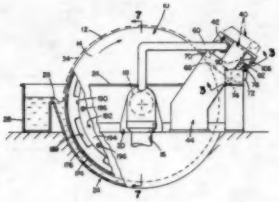
form first and second lengthwise spaced substantially closed portions, the first said separator having said feed inlet thereof open to the first portion of the chamber, to which first portion said housing inlet means communicates, and a second separator having said feed inlet thereof open to the second portion of said chamber, said first separator having its underflow outlet communicating with said second portion of the separating chamber so that outflow from the underflow outlet is in use directed through the second portion of the chamber to the feed inlet of the second separator.

4,673,496

DRUM FILTER TAKE-OFF

Ralph W. Turner, Jr., 1577 River Rd., Brunswick, Me. 04011

Filed Sep. 9, 1985, Ser. No. 774,139
Int. Cl.[4] B01D *33/06, 33/36*
U.S. Cl. 210—232 **42 Claims**



1. A continuous rotary drum vacuum filter system comprising

tank structure having an open top,

a hollow filter drum including a cylindrical foraminous surface and end plate structure to define an interior volume, shaft means extending axially in opposed directions from said end plate structure, at least one of said shaft means being hollow and in fluid communication with the interior of said drum,

means for supporting said drum for rotation and arranged to locate at least one half of the interior volume of said drum within said tank structure,

inlet means associated with said tank for supplying slurry to be filtered to said tank in the region outside said drum,

means for applying subatmospheric pressure to the interior of said filter drum to draw liquid from the slurry in said tank through said foraminous surface into the interior volume of said drum and form a pulp sheet on said foraminous surface,

outlet means for removing said filtered liquid through said hollow shaft means, and

take-off chamber structure supported on the descending side of said drum and extending along the axial length of said foraminous surface for removing said pulp sheet from the surface of said drum, said take-off chamber support mechanism comprising end pedestals, adjustment structure secured between said take-off chamber structure and said end pedestals, and means for operating said adjustment structure to provide initial precise adjustment of the entire take-off chamber structure relative to said filter drum as well as quick lifting of the entire take-off chamber structure for washing or maintenance purposes,

said take-off chamber structure including spaced side wall portions disposed for sealing engagement with an arcuate length of said filter drum,

chamber entry seal structure including first seal shoe means at the entry side of the chamber for sealing engagement with the pulp sheet on the drum surface to provide a chamber entrance seal,

pulp sheet slide structure within said take-off chamber for lifting said pulp sheet from said drum surface,

vaned discharge roll means extending along the axial length of said foraminious surface and cooperating with said pulp sheet slide structure for discharging said pulp sheet from said take-off chamber,

drive means for rotating said vaned discharge roll means in the direction of pulp sheet movement to draw said pulp sheet out of said take-off chamber,

chamber discharge seal means including second seal shoe means at the discharge side of the chamber for sealing engagement with said discharge roll means to provide a chamber discharge seal, and

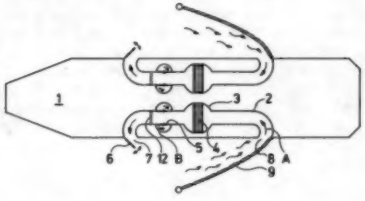
means for applying substantially the same subatmospheric pressure to the interior of said take-off chamber as to the interior of said filter drum to provide substantially no pressure differential across said pulp sheet in said take-off chamber.

4,673,497

OIL-SPILL-COMBATTING WATER CRAFT

Lars Lundin, Porvoo, Finland, assignor to Oy Lars Lundin Patent Ab, Porvoo, Finland

Filed Dec. 11, 1984, Ser. No. 680,454
Claims priority, application Finland, Dec. 21, 1983, 834705
Int. Cl.[4] B01D *17/032;* **E02B** *15/04*
U.S. Cl. 210—242.3 **8 Claims**



1. An oil-spill-combatting water craft, for travelling along a water surface and removing oil floating thereon, which said craft comprises a hull, a bow and a stern and two sides extending longitudinally between said bow and stern;

at least one water inlet located in one side of the hull at the water level at which the craft floats on the water surface;

an oil boom protruding from said one side in a direction forwards towards the bow and outwards from the hull and attached thereto next to the water inlet on the stern side thereof, said boom having a lower portion submerged in the water and an upper portion above the water level for directing surface water into said water inlet when the water craft travels on the water with the bow headed in the direction of travel;

at least one water discharge outlet located in said one side of the hull at a position forwards towards the bow from the water inlet; a conduit providing a communication between said water inlet and said water outlet, said conduit extending generally longitudinally of said craft at a location spaced inwardly from said side and curving smoothly at each end to connect with said inlet on the stern side thereof and with the outlet on the bow side thereof in order that water circulation therethrough be produced by the water-raising and water-guiding effect of the boom when the water craft travels forward; and

means provided in said conduit for separating oil from the surface water directed into the conduit.

4,673,498

AUTOMATIC BACKWASHING FILTER

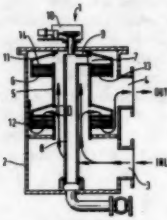
Denis P. Swinney; Norman Twizell, both of Morpeth, and Charles W. Fergusson, Monkseaton, all of United Kingdom, assignors to Swinney Engineering Limited, Northumberland, United Kingdom

Filed Oct. 2, 1985, Ser. No. 782,979

Claims priority, application United Kingdom, Oct. 4, 1984, 8425068

Int. Cl.[4] B01D *23/24, 27/12*

U.S. Cl. 210—275 **9 Claims**



1. A filter comprising a supporting member, a plurality of filter compartments supported by the supporting member for providing very fine filtration of fluid flowing through the filter means, each filter compartment having a first, top membrane and a second, bottom membrane, and fine particulate filter media retained in the compartment between the top and bottom membranes, the top and bottom membranes being of suitable aperture to retain the fine filter media in the compartment, the supporting member having apertures leading to the filter compartments, and backwash means co-operable with the supporting member and having at least one duct arranged to register with the apertures in the supporting member leading to the filter compartments, and means for causing the duct to register with respective apertures to permit backwashing thereof,the top membrane of each compartment comprising means for restricting deterioration of the filter media during backwashing.

4,673,499

WATER SEPARATOR AND FILTER FOR LIQUID HYDROGENS

Paul Koch, Oberursel, and Eberhard von Künszberg, Bad Homburg, both of Fed. Rep. of Germany, assignors to Faudi Feinbau GmbH, Oberursel, Fed. Rep. of Germany

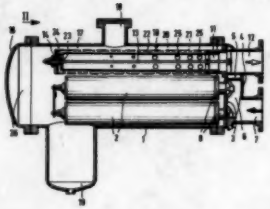
Filed Mar. 24, 1982, Ser. No. 361,456

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1981, 3145964

Int. Cl.[4] B01D *25/02*

U.S. Cl. 210—295 **3 Claims**

1. A device for separating water and filtering pollutants from liquid hydrocarbon, comprising a substantially horizontally directed housing provided at one end thereof with an inlet port and with an outlet port for the treated hydrocarbons; at least one tubular filtering and coalescing member having one open end connected to said inlet port, and a closed end supported within the housing; at least one tubular water separating member arranged parallel to said filtering and coalescing member and having one open end connected to said outlet port, and a closed opposite end supported in said housing; and an inner tubular member coaxially arranged in said separating member to form an annular interspace therein, one end of said inner



member communicating with the outlet port and the other end of said inner member being provided with inlet openings for passing the separated hydrocarbons from said interspace to said outlet port; said inner tubular member being provided with a plurality of inlet openings on its jacket and the combined cross-sections of said openings per a length unit increasing in the direction from the closed end of the separating member towards its outlet end.

4,673,500

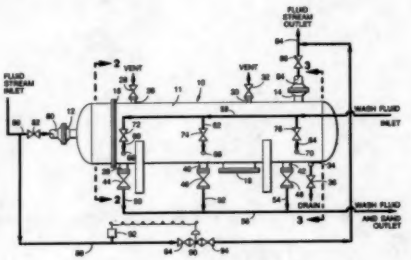
SAND SEPARATION AND REMOVAL METHOD AND APPARATUS

Rodger A. Hoofnagle, Opelousas, La., and William S. Young, The Woodlands, Tex., assignors to Amoco Corporation, Chicago, Ill.

Filed Apr. 15, 1985, Ser. No. 723,244

Int. Cl.[4] B01D *27/00*

U.S. Cl. 210—307 **6 Claims**



1. An apparatus comprising: means for removing sand from the interior of a separator vessel, the separator vessel including a closed separator vessel including an upper interior surface and a lower interior surface,

an inlet for introducing a fluid stream into the separator vessel,

first filter means for separating sand from the fluid stream disposed within the separator vessel adjacent the upper interior surface, the first filter means including an outlet for discharging the fluid stream from which sand has been separated and removed,

a fluid outlet in fluid communication with the outlet in the first filter means for discharging the fluid stream from the separator vessel,

at least one sand discharge outlet for removing separated sand from the interior of the separator vessel, and

means for washing separated sand from the interior of the

separator vessel comprising at least one wash conduit extending into a lower portion of the separator vessel for introducing a wash liquid, an outlet end of the at least one wash conduit including second filter means spaced above the lower interior surface of the separator vessel for preventing the entry of sand into the at least one wash conduit.

4,673,501

BOTTLE TOP FILTER

John R. Wells, Culver City, Calif., and Carmelo G. Quirante, Bolingbrook, Ill., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Filed Nov. 19, 1985, Ser. No. 799,393
Int. Cl.[4] B01D *35/00*
U.S. Cl. 210—406 **8 Claims**

1. A bottle top filter employing a vacuum source for filtering a fluid and passing the fluid into a bottle, the bottle top filter comprising:

a funnel including a receptacle and a tube, the receptacle of said funnel for catching the fluid and directing the fluid into the tube, the tube connected to the receptacle and insertable into the bottle for channeling the fluid from the receptacle into the bottle,

a filter support nested within the receptacle,

a filter fitted into the receptacle over said filter support and supported by said filter support for filtering the fluid channeled from the receptacle into the tube,

a gasket attached to the receptacle for sealing the receptacle to the bottle, said gasket defining a perimeter and a hole, the tube extending through the hole for inserting into the bottle, and

a means for providing a direct vacuum conduit for conducting air directly from the bottle to the vacuum source, said direct vacuum conduit lacking a vacuum plenum and incorporated directly into the receptacle, said direct vacuum conduit including an egress port and an ingress port, the egress port positioned outside the perimeter of said gasket for connecting said direct vacuum conduit to the vacuum source, the ingress port positioned inside the hole of said gasket for drawing off air from the bottle,

said funnel and said direct vacuum conduit forming a single seamless molded piece,

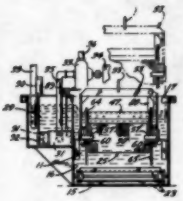
so arranged to provide means for connecting the vacuum source to said direct vacuum conduit and sealing said funnel to the bottle by means of said gasket for causing air to be drawn from the bottle directly into the vacuum source through the direct vacuum conduit, and, further, after introducing the fluid into said funnel, for causing the fluid to be drawn across said filter through the tube and into the bottle.

4,673,502

FIXED FILTER DRUM AND MOVABLE SCRAPER

Robert J. Fox, Bowling Green, Ohio, assignor to Barnes Drill Co., Rockford, Ill.

Filed May 28, 1985, Ser. No. 738,347
Int. Cl.[4] B01D *41/04, 29/38*
U.S. Cl. 210—413 **5 Claims**



5. A filter for removing particles from dirty liquid, said filter comprising a tank for receiving a flow of dirty liquid, a generally cylindrical drum disposed within said tank and submerged in the dirty liquid therein, sad drum having a porous cylindrical wall and having two ends, a suction line connected to one end of said drum and communicating with the inside of the drum, means for applying a vacuum to said suction line to cause the dirty liquid in said tank to flow through the cylindical wall of said drum to the inside of said drum and then to flow out of said drum through said suction line, particles in such liquid collecting on the outer surface of the drum and forming a cake for filtering the liquid, and a scraper for periodically removing a portion of said cake from said drum, said filter being characterized in that said drum is non-rotatable mounted in said tank, said scraper being mounted to rotate about the longitudinal axis of the drum and around the entire outer circumference of said drum and being operable when rotated to remove a portion of said cake from said drum, and means for rotating said scraper about the axis of said drum, and a stationary pipe extending through one wall of said tank and having one end communicating with said suction line, the other end poriton of said pipe being telescoped slidably with and being sealed to said one end of said drum.

4,673,503

VARIANT LENGTH PLEATED FILTER ELEMENT

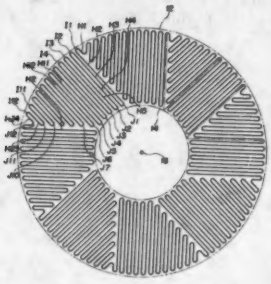
Etsuo Fujimoto, Yokohama, Japan, assignor to Tokyo Roki Co., Ltd., Kanagawa, Japan

Filed Nov. 12, 1985, Ser. No. 799,168
Claims priority, application Japan, Jul. 18, 1985, 60-108811[U]; Jul. 18, 1985, 60-108812[U]; Jul. 25, 1985, 60-113105[U]
Int. Cl.[4] B01D *27/06*
U.S. Cl. 210—493.1 **4 Claims**

1. A filter element comprising a pair of end plates arranged in parallel with each other and a filter material disposed between said end plates to form a hollow cylinder having an outer circumference and an inner circumference, said inner and outer circumference cooperating to form an annular space, said inner and outer circumference cooperating to form an annular space, said filter material being folded so as to form a plurality of pleats connected to each other through outer ridges and inner ridges, wherein:

the space defined between said outer circumference and said inner circumference is divided into at least six areas to contain said pleats with symmetrical pattern with respect to the center of said hollow cylinder, said pleats in each said area being arranged substantially in parallel with each other at equal intervals, said outer ridges in each said area being arranged substantially at equal intervals along said outer circumference, and each said area including a first group of said inner ridges arranged substantially along one

of said pleats in the adjacent area to thereby vary the length of said pleats connected through said first group of said inner ridges, and a second group of said inner ridges



arranged substantially at equal intervals along said inner circumference whereby said pleats connected through said second group of said inner ridges have substantially the equal length.

4,673,504

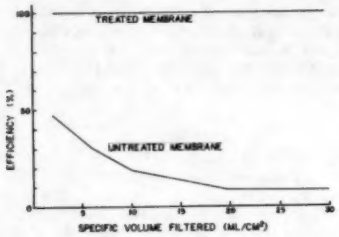
CHARGE MODIFIED MICROPOROUS MEMBRANE

Eugene A. Ostreicher, Farmington; Rodney A. Knight, New Milford; Joseph V. Fiore, Fairfield; George T. Emond, Southington, all of Conn., and Kenneth C. Hou, San Antonio, Tex., assignors to Cuno Inc., Meriden, Conn.

Continuation of Ser. No. 314,307, Oct. 23, 1981, Pat. No. 4,473,474, which is a continuation-in-part of Ser. No. 201,366, Oct. 27, 1980, abandoned. This application Sep. 11, 1984, Ser. No. 649,561

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—500.22 **11 Claims**



1. A hydrophilic, cationic charge modified microporous filter membrane comprising:

a substantially isotropic, porous, hydrophilic, microporous cast nylon film membrane having a microstructure throughout said membrane; and

a polyamido-polyamine epichlorohydrin cationic charge modifying agent having tertiary amine or quaternary ammonium groups, said agent being bonded to substantially all of said membrane microstructure without substantial pore size reduction or pore blockage.

4,673,505

WASTEWATER TREATMENT BACTERIAL ADDITIVE

John M. Wong, Cleveland, Ohio, assignor to Envirodyne, Inc., Manistee, Mich.

Filed Mar. 4, 1986, Ser. No. 836,141

Int. Cl.[4] C02F *3/34*; C12N *1/04, 1/20, 1/36*

U.S. Cl. 210—611 **12 Claims**

1. An aqueous suspension of inhibited bacteria comprising aerobic bacteria capable of degrading organic materials which exert biochemical oxygen demand, water and an effective inhibiting amount of about 0.002 to 0.02% by weight based on the weight of the aqueous bacterial suspension of an inorganic azide compound.

4,673,506

CLEANING TREATMENT FOR BLOOD COMPARTMENTS OF DIALYZATORS

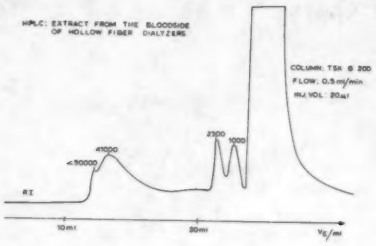
Werner Henne, and Michael Pelger, Wuppertal, both of Fed. Rep. of Germany, assignors to AKZO NV, BM Arnhem, Netherlands

Continuation of Ser. No. 615,474, May 29, 1984, abandoned. This application Nov. 25, 1985, Ser. No. 801,520

Claims priority, application Fed. Rep. of Germany, May 28, 1983, 3319504

Int. Cl.[4] B01D *13/04*

U.S. Cl. 210—636 **22 Claims**



1. A method for the cleaning of blood compartments of dialyzators during the preparation stage with means for washing, said dialyzators containing membranes of cellulose in hollow filament, tube or flat form, comprising:

washing said blood compartments with pure water or water containing at least one electrolyte and organic solvent;

allowing the pure water or water containing at least one electrolyte and organic solvent, used to wash said blood compartments, to run off;

filling said blood compartments with a mixture of water, glycerin and alcohol;

allowing said mixture to run off;

drying said blood compartments; and sterilizing said blood compartments.

4,673,507

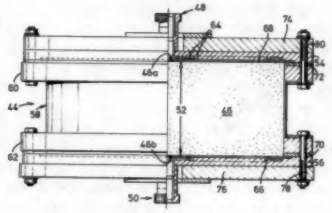
FLUID TREATMENT PROCESS AND APPARATUS

Craig J. Brown, Pickering, Canada, assignor to Eco-Tec Limited, Pickering, Canada

Filed May 23, 1985, Ser. No. 737,123

Int. Cl.[4] C02F *1/42*

U.S. Cl. 210—681 **18 Claims**



1. Apparatus for treating a fluid to remove a component therefrom, by a process in which the fluid is passed through a

bed of particulate material capable of taking up the component from the fluid, wherein the apparatus comprises:

a vessel containing a said bed of particulate material, said material being an ion exchange resin that is both capable of taking up said component from the fluid and capable of being regenerated in place, and the volume of which changes appreciably in use, the vessel having first and second ports for permitting flow of fluid through the bed from said first port to said second port and reverse flow for regeneration of said resin.

means confining the bed within the vessel so that the bed defines first and second end faces, a substantially constant bed depth between said faces of less than about 30 inches, and a cross-sectional area which is constant or increases uniformly from one face to the other, said confining means including headers at the respective bed end faces, each including fluid flow passageways providing communication between the bed and the relevant one of said ports, the passageways being arranged to distribute fluid flowing from a said port into the bed substantially evenly over the cross-sectional area of the bed at said face;

said resin being fully confined by said confining means in an overpacked condition, the particle size and the degree of overpacking of said resin being selected to provide for substantially even distribution of fluid across the cross-sectional area of the bed in flowing between said bed end faces.

10. A process for treating a fluid to remove a component therefrom, in which the fluid is passed through a bed of a particulate material in the form of an ion exchange resin that is capable of both taking up the component from the fluid and of being regenerated in place and the volumne of which changes appreciably in use, wherein the bed comprises particles of substantially uniform size maintained in an overpacked condition between first and second end faces of the bed, the bed defining a substantially constant depth between said faces of less than about 30 inches and a cross-sectional area which is constant or increases uniformly from one face to the other, and wherein the fluid is passed through the bed by distributing the fluid substantially uniformly across one of said end faces, permitting the fluid to flow through the bed and collecting the fluid substantially uniformly across the other said end face, the size of the particles in the bed and the degree of overpacking being selected to provide for substantially even distribution of fluid across the cross-sectional area of the bed in flowing between said bed end faces, and the process being operated at a capacity of less than about 35% of the maximum capacity of the process.

4,673,508

INHIBITION OF CALCIUM PHOSPHATE SCALE FORMATION WITH A MALEATE POLYMER

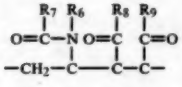
James P. Coleman, St. Louis; George Kvakovszky, and David J. Sikora, both of Ballwin, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 630,789, Jul. 13, 1984, abandoned. This application Nov. 13, 1985, Ser. No. 797,560

Int. Cl.[4] C02F *5/12*

U.S. Cl. 210—698 **17 Claims**

1. A method for inhibiting the precipitation of calcium phosphate in an aqueous medium having a pH of at least 8.5, comprising adding to said aqueous medium an effective amount of a water soluble maleate polymer consisting essentially of the following repeating structural moiety:



(a) where R_6 and R_7 are the same or different and are alkyl groups or R_6 and R_7 may join together to form a lactam ring, and (b) where R_8 and R_9 are individually a free acid or water soluble salt of a free acid or R_8 and R_9 together may be an oxygen to form an acid anhydride.

4,673,509

BIOCIDAL WATER TREATMENT

Keith P. Davis, Bromsgrove, and Robert E. Talbot, Cannock, both of England, assignors to Albright & Wilson Limited, Warley, England

Filed Aug. 27, 1984, Ser. No. 644,783

Claims priority, application United Kingdom, Aug. 26, 1983, 8323025; Dec. 16, 1983, 8333787

Int. Cl.[4] C02F *5/14*

U.S. Cl. 210—699 **14 Claims**

1. A method for treating a water system susceptable to infection by aquatic microorganisms in order to inhibit the growth of the latter, which method comprises adding to said water system at least one phosphorus compound selected from the group consisting of: compounds which have the formula $(HORPR'_3)yX$ wherein y is equal to the valvency of X; R is an alkylene group of 1 to 4 carbon atoms; each R′ is separately selected from the groups consisting of alkyl and alkenyl groups having up to 4 carbon atoms and groups of the formula HOR—, wherein R is as defined above; and X is an anion such that the phosphorus compound is water soluble; and condensates thereof; said phosphorus compound being added in a quantity at least sufficient to inhibit the growth of mocroorganisms in said water systems.

4,673,510

PROCESS FOR THE DISPOSAL OF SETTLED SLUDGE DERIVED FROM A BIOLOGICAL SEWAGE-DISPOSAL PLANT

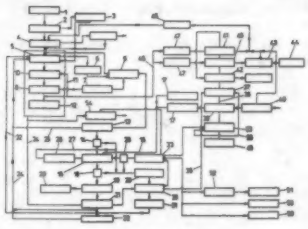
Alois Janusch, Kindberg-Aumühl; Walter Lugscheider, Linz, and Fritz Ludewig, Leoben, all of Austria, assignors to Voest-Alpine Aktiengesellschaft, Vienna, Austria

Filed Dec. 9, 1985, Ser. No. 807,026

Claims priority, application Austria, Dec. 17, 1984, A 4000/84

Int. Cl.[4] B01D *45/14*

U.S. Cl. 210—712 **11 Claims**



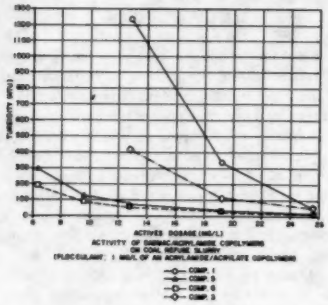
1. A process for the disposal of settled sludge derived from a biological sewage-disposal plant, of the kind in which the thickened sludge is further dewatered and is at least partially decomposed within a centrifuge by using saturated steam, preferably at a pressure within the range of 1 to 15 bar and at a temperature of 100° C. to 200° C., the improvement comprising discharging the centrifugate of the centrifuge via a lock and immediately subsequently subjecting the centrifugate to a sulfidic precipitation of heavy metals, discharging the solid matter separated within the centrifuge via locks, subjecting said solid matter at least partially to a combustion step for steam production for the centrifuge, recycling the steam within a closed circuit, and utilizing waste steam from the locks for air-heating, whereupon the condensate thus formed is supplied to a preliminary settling basin of the sewage-disposal plant.

4,673,511

ACRYLAMIDE DIALLYL DIMETHYL AMMONIUM CHLORIDE COPOLYMERS AS IMPROVED DEWATERING ACIDS FOR MINERAL PROCESSING

Paul F. Richardson, Glen Ellyn, and Bhupati R. Bhattacharyya, Downers Grove, both of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Sep. 30, 1985, Ser. No. 781,614
Int. Cl.[4] C02F 1/56
U.S. Cl. 210—734 3 Claims



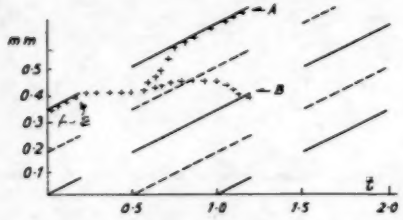
1. An improved method of dewatering mineral slurries which comprises treating said slurries with a dewatering amount of a copolymer of acrylamide and DADMAC, which polymers are characterized as containing from 3–50 mole percent of acrylamide and having a Reduced Specific Viscosity of at least 2.

4,673,512

PARTICLE SEPARATION

Cornelius J. Schram, Bedford, England, assignor to Internationale Octrooi Maatschappij "Octropfa" BV, Rotterdam, Netherlands

Filed Jul. 5, 1985, Ser. No. 751,951
Claims priority, application United Kingdom, Jul. 6, 1984, 8417240
Int. Cl.[4] B01D 17/06; C02F 1/36
U.S. Cl. 210—748 6 Claims



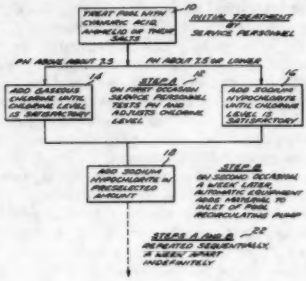
1. In a method of separating different types of particles in which an ultrasonic standing wave having an axis of propagation, and a series of nodes transverse to the axis is propagated in a liquid medium and there is relative motion between the medium and the standing wave, the different types of particles being differently influenced by the acoustic energy of the standing wave and/or the Stokes or drag forces of the fluid medium, the improvement comprising cyclically varying the energy propagation of said standing wave so that the different particle types are caused to move at cyclically varying rates in the direction of the axis of propagation and thereby progressively separating said different particle types while remaining suspended in the liquid medium.

4,673,513

PROCESS FOR CHLORINATION OF SWIMMING POOLS

Jonathan S. Powell, Jr., 5094 Tip Top Rd., Mariposa, Calif. 95338

Filed Jul. 2, 1986, Ser. No. 881,457
Int. Cl.[4] C02F 1/76; E04H 3/20
U.S. Cl. 210—756 5 Claims


TREAT POOL WITH CYANURIC ACID, AMMELIDE OR THEIR SALTS
10
INITIAL TREATMENT BY SERVICE PERSONNEL
PH ABOVE ABOUT 7.5
PH ABOUT 7.5 OR LOWER
14
12
16
ADD GASEOUS CHLORINE UNTIL CHLORINE LEVEL IS SATISFACTORY
STEP A ON FIRST OCCASION SERVICE PERSONNEL TESTS PH AND ADJUSTS CHLORINE LEVEL
ADD SODIUM HYPOCHLORITE UNTIL CHLORINE LEVEL IS SATISFACTORY
18
ADD SODIUM HYPOCHLORITE IN PREDETECTED AMOUNT
STEP B ON SECOND OCCASION A WEEK LATER, AUTOMATIC EQUIPMENT ADDS MATERIAL TO INLET OF POOL RECIRCULATING PUMP
STEPS A AND B REPEATED SEQUENTIALLY AT WEEKLY START INDEFINITELY
22

1. The process of adjusting chlorine and pH levels in the water of a swimming pool having a recirculating water line including a pump, comprising:

(a) treating the water with material selected from the group consisting of cyanuric acid, ammelide and their salts in an amount effective to stabilize sanitizing active chlorine in aqueous solution against decomposition by ultraviolet light,

(b) subsequently, on a first occasion, adding gaseous chlorine if the water has a pH above about 7.5 and adding sodium hypochlorite if the water has a pH about 7.5 or lower, in an amount determined by a reading of the existing level of chlorine in the water so that the level of chlorine is sufficient to sanitize the water,

(c) a set number of days later, with automatic equipment, without taking a reading of water conditions, adding sodium hypochlorite to the water in a predetermined amount by introducing the sodium hypochlorite to said recirculating water line so that the level of chlorine in the water is sufficient to sanitize the water, and (d) continuing the process indefinitely by alternating steps (b) and (c) at intervals of said set number of days.

4,673,514

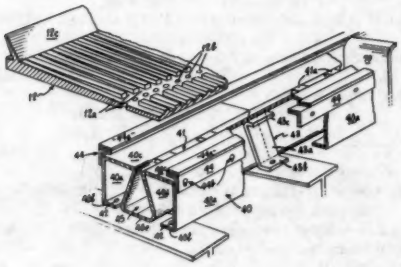
FLUID FILM BEARING FOR USE IN HORIZONTAL BELT VACUUM FILTERS

Francis J. Casey, Edison; Ernest T. DePass, Bound Brook, and Kevin R. Gilman, Pequannock, all of N.J., assignors to Enviro-Clear Company, Inc., Somerville, N.J.

Division of Ser. No. 423,627, Sep. 27, 1982, Pat. No. 4,483,770. This application Feb. 8, 1985, Ser. No. 654,170
Int. Cl.[4] B01D 33/04
U.S. Cl. 210—783 8 Claims

1. A method of preventing surface to surface contact between a moving member and a stationary member, each member having a surface, said moving member and stationary member being positioned in opposed relationship to the other member, which comprises supplying fluid under pressure to an interfacial space defined by the opposed surfaces between said moving member and said stationary member which has respective edges and periphery, said edges and periphery defining two or more parallel and longitudinally oriented fluid chambers, at least one of said chambers positioned under each side of said moving member between the center and each peripheral edge of said moving member, each of said stationary members having an upwardly directed longitudinal slot through which

fluid under pressure is directed toward a portion of the lower portion of said moving member, so as to maintain interfacial space between said moving member and stationary member and to prevent surface to surface contact therebetween, permitting the fluid supply to interfacial space between moving member and said stationary member to escape therefrom at the edges and periphery of the interfacil space defined by the



opposed surfaces of said moving member and said stationary member, and continuously supplying said fluid under pressure to said interfacial space to maintain the opposed surfaces of said moving member and said stationary member from contact with each other.

3. A method in accordance with claim 1 wherein said moving member and said stationary member are provided in a horizontal belt vacuum filter.

4,673,515

BEARING BUSH FOR CENTER PINS ON A PIANO ACTION

Toshiaki Sakai, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Sep. 17, 1985, Ser. No. 776,902

Claims priority, application Japan, Sep. 25, 1984, 59-145150[U]

Int. Cl.[4] F16C *33/12*

U.S. Cl. 252—12 **7 Claims**

1. An improved bearing bush for center pins on a piano action comprising

a bush cloth containing synthetic resin of low saturated moisture content, and covered or impregnated with lubricative resin on its surface to be in contact with a center pin.

4,673,516

AQUEOUS HYDROGEL LUBRICANT

Johnny D. Berry, Duncanville, Tex., assignor to Integral Corporation, Dallas, Tex.

Filed Sep. 2, 1986, Ser. No. 902,514

Int. Cl.[4] C10M *173/02, 145/40*

U.S. Cl. 252—49.5 **8 Claims**

1. An aqueous gel lubricant, comprising:

(a) a major proportion of water;

(b) an effective gelling amount of an anionic heteropolysaccharide; and

(c) an effective lubricating amount of an anionic emulsion of a polysiloxane polymer.

8. A method for reducing the coefficient of friction between a cable and an outer conduit through which the cable is pulled, comprising:

preparing an aqueous gel lubricant of a major proportion of water, an effective gelling amount of an anionic heteropolysaccharide, and an effective lubricating amount of an anionic emulsion of a polysiloxane polymer; and

applying said aqueous gel lubricant at the interface of the outside surface of said cable and the internal surface of said outer conduit.

4,673,517

HEAT PUMP

Naonori Enjo, Suita; Masahiro Noguchi, Osaka, and Satoshi Ide, Settsu, all of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

Continuation of Ser. No. 617,471, Jun. 5, 1984, abandoned. This application Dec. 2, 1985, Ser. No. 803,525

Claims priority, application Japan, Jun. 6, 1983, 58-101372

Int. Cl.[4] C09K *5/04*

U.S. Cl. 252—67 **4 Claims**

1. In a heat pump comprising a working fluid used for converting a low-grade heat energy to high-grade heat energy, the improvement wherein said working fluid comprises 2,2,3,3,3-pentafluoropropanol or an admixture thereof with up to 10% by weight of water.

4,673,518

SYNTHETIC POLYETHER THICKENERS AND THICKENED AQUEOUS SYSTEMS CONTAINING THEM

James P. Owens, Wyandotte, and Charles F. Deck, Trenton, both of Mich., assignors to BASF Corporation, Wyandotte, Mich.

Filed Mar. 7, 1986, Ser. No. 837,537

Int. Cl.[4] C10M *119/16, 173/02*

U.S. Cl. 252—75 **25 Claims**

1. A synthetic associative polyether thickener prepared by reacting a conventional polyether polyol with an alpha-olefin epoxide having an average of from 6–12 total carbon atoms such that

(a) the reaction is carried out in the presence of an oxyalkylation catalyst at a temperature of from about 50° C. to about 150° C.; and

(b) an epoxide-to-hydroxyl ratio defined as follows:

(i) if a C_{12} alpha-olefin epoxide is reacted with the conventional polyether polyol, then the epoxide-to-hydroxyl ratio is from about 0.50 to about 1.0;

(ii) if a C_{10} alpha-olefin epoxide is reacted with the conventional polyether polyol, then the epoxide-to-hydroxyl ratio is from about 0.75 to about 1.25;

(iii) if a C_8 alpha-olefin epoxide is reacted with the conventional polyether polyol, then the epoxide-to-hydroxyl ratio is from about 1.0 to about 2.0; and

(iv) if a C_6 alpha-olefin epoxide is reacted with the conventional polyether polyol, then the epoxide-to-hydroxyl ratio is from about 1.5 to about 3.5.

4,673,519

LOW-ENERGY PROCESS FOR THE MANUFACTURE OF CALCIUM/MAGNESIUM ACETATE-CHLORIDE DEICERS AND FREEZING POINT DEPRESSANTS

Alan B. Gancy, 265 Robineau Rd., Syracuse, N.Y. 13207

Filed Jun. 24, 1985, Ser. No. 747,579

Int. Cl.[4] C09K *3/18*

U.S. Cl. 252—70 **15 Claims**

1. A process for manufacturing calcium acetate-chloride comprising the following steps:

(a) dry-blending calcium acetate powder and calcium chloride dihydrate powder such as the mol ratio of calcium chloride to calcium acetate ranges from greater than zero, to one;

(b) adding water to the dry-blend with agitation until pellets are formed; and

(c) drying the pellets to the desired water level in the product.

4,673,520

THERMAL ENERGY STORAGE COMPOSITIONS

Malcolm Hawe; David Marshall, and John R. Walker, all of West Yorkshire, England, assignors to Allied Colloids Ltd., England

Continuation of Ser. No. 638,938, Aug. 9, 1984, abandoned, which is a continuation-in-part of Ser. No. 465,379, Feb. 10, 1983, abandoned. This application Jan. 6, 1986, Ser. No. 816,686

Claims priority, application United Kingdom, Aug. 12, 1983, 8321730

Int. Cl.[4] C09K *5/06*

U.S. Cl. 252—70 12 Claims

1. In a method of providing a heat exchange vessel with a filling of a thermal energy storage composition comprising an intimate mixture of (a) a thermal energy storage compound that is a hydrate that has a transition temperature at which the hydrate passes from a first energy state in which it is a solid to a second, less hydrated, energy state in which it comprises solid and liquid phases and (b) a solid, water swellable, water insoluble, thermally conducting, cross-linked polymer that is capable of reversibly absorbing and desorbing water of hydration of the said hydrate while remaining as a solid, the improvement comprising forming the composition by blending particles of the said hydrate in its said second energy state with the said polymer in the form of substantially dry particles up to 1 mm in size and with substantially the amount of free water required to provide the said first energy state of the hydrate, and filling the composition into the vessel, whereby the polymeric material will prevent separation of the said solid and liquid phases of the hydrate in the vessel during reversible and repeated storage and release of thermal energy.

4,673,521

PROCESS FOR REGENERATING SOLDER STRIPPING SOLUTIONS

Thomas E. Sullivan, Hamden, and Mark A. Kulak, Milford, both of Conn., assignors to Enthone, Incorporated, West Haven, Conn.

Filed Jan. 21, 1986, Ser. No. 820,038

Int. Cl.[4] C09K *13/08*

U.S. Cl. 252—79.3 7 Claims

1. A method of regenerating for reuse an aqueous stripping solution comprising hydrofluoric acid or salts thereof, ammonia and an oxygen source which solution has been used to strip solder from a substrate comprising:

(a) adding potassium ions to the solution to precipitate a tin containing compound from the solution;

(b) removing the precipitated tin from the resulting solution; and

(c) adding components of the stripping solution, as necessary, to regenerate the solution.

4,673,522

METHODS FOR REMOVING OBSTRUCTIONS FROM CONDUITS WITH UREA-SULFURIC ACID COMPOSITIONS

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Continuation-in-part of Ser. No. 453,496, Dec. 27, 1982, which is a continuation-in-part of Ser. No. 318,629, Nov. 5, 1981, Pat. No. 4,445,925. This application Nov. 28, 1984, Ser. No. 675,774

Int. Cl.[4] B08B *3/08;* C11D *7/08, 7/32;* C23G *3/04*

U.S. Cl. 252—87 31 Claims

1. A method for clearing an obstruction from the interior of a conduit, which method comprises the step of contacting said obstruction with a composition comprising urea, sulfuric acid, and water, in which the urea/sulfuric acid molar ratio is within the range of about ½ to less than 2, and wherein said obstruction comprises matter selected from the group consisting of protein, cellulose, and combinations thereof.

29. A method for removing an obstruction from the interior of a conduit which method comprises the step of contacting said obstruction with a composition comprising urea, sulfuric acid and about 1 weight percent water or less, in which composition the urea/sulfuric acid molar ratio is within the range of about 1/1 to less than 2, and wherein said obstruction comprises matter selected from the group consisting of protein, cellulose, and combinations thereof.

4,673,523

GLASS CLEANING COMPOSITION CONTAINING A CYCLIC ANHYDRIDE AND A POLY(ACRYLAMIDOMETHYLPROPANE) SULFONIC ACID TO REDUCE FRICTION

James A. Smith, Chatham, Mass., and George W. Kellett, Cranford, N.J., assignors to Creative Products Resource Associates, Ltd., Clifton, N.J.

Filed Apr. 16, 1986, Ser. No. 852,540

Int. Cl.[4] C11D *3/20, 3/30, 3/37, 17/04*

U.S. Cl. 252—91 20 Claims

1. A glass cleaning solution comprising:

(a) about 0.005–1% of a monomeric cyclic anhydride having a molecular weight of about 100–500;

(b) an amount of ammonia or an amine effective to solubilize said anhydride compound;

(c) about 0.025–0.5% of poly(2-acrylamido-2-methyl propane) sulfonic acid;

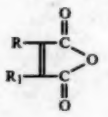
(d) an effective amount of an anionic surfactant;

(e) an effective grease-solubilizing amount of a (C_1–C_4)alkylene (C_1–C_4) alkyl ether or a (C_1–C_4) dialkylene (C_1–C_4)alkyl ether;

(f) about 5–25% of a (C_1–C_4) alkanol;

(g) the balance water.

2. The glass cleaning solution of claim 1 further comprising about 0.03–0.25% of a copolymer derived from (1) a maleic anhydride of the formula



wherein R and R_1 are independently selected from the group consisting of H, (C_1–C_4) alkyl, phenyl, (C_1–C_4) alkylphenyl, phenyl (C_1–C_4) alkylene and (2) a (C_1–C_4) olefin.

4,673,524

CLEANER COMPOSITION

Ralph R. Dean, P.O. Box 1492, Fort Worth, Tex. 76101

Filed May 16, 1986, Ser. No. 863,847

Int. Cl.[4] C11D *9/30, 17/00*

U.S. Cl. 252—118 2 Claims

1. A cleaner for cleaning from items, even freshly dried, difficultly removable objectionable material comprising:

a. at least twenty-five percent (25%) by weight and no more than sixty percent (60%) by weight of dibasic ester consisting essentially of an admixture of dimethyl succinate, dimethyl glutarate and dimethyl adipate;

b. at least five percent (5%) by weight and no more than twenty-five percent (25%) by weight of dipropylene glycol methyl ether;

c. at least five percent (5%) by weight and no more than twenty-five percent (25%) by weight of odorless mineral spirits;

d. at least four percent (4%) and no more than nine percent (9%) by weight of triethanolamine;

e. at least five percent (5%) and no more than fifteen percent (15%) by weight of octylphenoxypolyethoxyethanol in which there are seven to eight moles ethylene oxide per mole of octyl phenol;

f. at least one percent (1%) and no more than three percent (3%) by weight of nonyl phenol ethoxylate having about

four moles of ethylene oxide per mole of nonyl phenol; and

g. at least eight percent (8%) and no more than eighteen percent (18%) by weight of tall oil fatty acid.

4,673,525

ULTRA MILD SKIN CLEANSING COMPOSITION

Leonard E. Small; Paul H. Garrison, Jr.; William M. Winkler, all of Cincinnati; Sharon A. Seaman, Milford, and Alyce J. Papa, Wyoming, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed May 13, 1985, Ser. No. 733,670

Int. Cl.[4] C11D *9/02, 9/60*

U.S. Cl. 252—132 **27 Claims**

1. An ultra mild skin cleansing toilet bar composition comprising:

A. 20–70% mild synthetic surfactant;

B. 10–30% moisturizer;

C. 0.1–5% polymeric skin mildness aid, and

D. 5.5–25% soap;

wherein said synthetic surfactant and said soap have a weight ratio of from 2:1 to 12:1; and

wherein said moisturizer to soap have a weight ratio of from 1:1 to 7:1;

wherein said moisturizer consists essentially of stearic and lauric acid having a weight ratio of 2:1 to 1:1.5; and

wherein said soap to polymer have a stoichiometric ratio of from about 1:1 to about 17:1 on a charge basis.

4,673,526

ANHYDROUS SKIN CLEANSING COMPOSITION CONTAINING AN OIL PHASE, AN EMULSIFYING AGENT AND PARTICULATE WATER SOLUBLE POLYMERIC ABRASIVE PARTICLES

Arlette Zabotto, Paris, and Jean-Claude Contamin, Chilly Mazarin, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Filed May 15, 1985, Ser. No. 734,139

Claims priority, application France, May 15, 1984, 84 07487

Int. Cl.[4] C11D *1/78, 3/37*

U.S. Cl. 252—174.16 **11 Claims**

9. An anhydrous skin cleansing composition comprising an oily phase, at least one emulsifying agent and at least one water-soluble polymeric particulate abrasive substance,

said oily phase being present in an amount ranging from 50 to 95 percent by weight based on the total weight of said composition and comprising an oil, a mixture of oils or a mixture of at least one oil and at least one wax,

said emulsifying agent being present in an amount ranging from 1 to 30 weight percent based on the total weight of said composition and being selected from the group consisting of egg lecithin, soy lecithin, a polyglycerol alkyl ether, a glycerol stearate, an ester of sorbitan with a fatty acid, a polyoxyethylenated fatty acid and an ester of phosphoric acid with an ethoxylated fatty acid, and

said particulate abrasive substance (1) being present in an amount ranging from 1 to 10 weight percent based on the total weight of said composition, (2) having a particle size ranging from 50 to 1,000 microns and (3) being selected from the group consisting of a xanthane gum, a carboxymethylamidon, a cellulose ether, a hydroxyalky cellulose and a copolymer of acrylic acid and acrylamide.

4,673,527

TABLET GRANULATION

Paul R. Goudy, Jr., Bayside, Wis.; Linn W. Cassedy, Roselle, and Thomas S. Whitaker, Bartlett, both of Ill., assignors to Autotrol Corporation, Milwaukee, Wis.

Filed May 20, 1985, Ser. No. 735,845

Int. Cl.[4] C02F *5/10*

U.S. Cl. 252—181 **12 Claims**

4. A granulation or tablet product wherein a dry ingredient is entrapped in a polymeric material, the dry ingredient being different from the polymeric material and being less water soluble, said product produced by the steps comprising:

treating said polymeric material with an alcohol which is substantially free of water to blanket said polymeric material from moisture and air;

admixing said alcohol treated polymeric material with said dry ingredient; and

combining said admixed product with water to bond the polymeric molecules of said polymeric material together and entrap said ingredient in a polymeric matrix;

said dry ingredient being entrapped by said polymeric material in a homogenous manner with the polymer chains and the charge sites of said polymers being separated by said alcohol and water treatment steps prior to said entrapment.

4,673,528

SOLID H_2/D_2 GAS GENERATORS

Glen D. Artz, Portola, and Louis R. Grant, Los Angeles, both of Calif., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 30, 1985, Ser. No. 781,820

Int. Cl.[4] C01B *3/04;* **C06B** *27/00*

U.S. Cl. 252—188.25 **3 Claims**

1. A thermally stable, solid reactant hydrogen and deuterium gas generator compositions comprising in weight percentages as follows: an oxidizer compound selected from the group of oxidizer compounds consisting of $LiNO_3$ and KNO_3 from about 5 to about 15; a binder of polytetrafluoroethylene from about 2 to about 15; and magnesium borohydride diammoniate in an amount from about 80 to about 90 as a source of hydrogen gas or the equivalent weight of the deuterated analog of said magnesium borohydride diammoniate is a source of deuterium gas.

4,673,529

PHENOXYPROPANOL ESTER DERIVATIVE

Shigeru Sugimori, Fujisawashi; Tetsuya Ogawa, Yokohamashi; Yasuyuki Goto, Yokohamashi; Toyoshiro Isoyama, Yokohamashi; Kazunori Nigorikawa, Yokohamashi; Kisei Kitano, Yokohamashi; Naoyuki Yoshida, Kamakurashi, and Yoshito Furukawa, Yokohamashi, all of Japan, assignors to Chisso Corporation, Tokyo, Japan

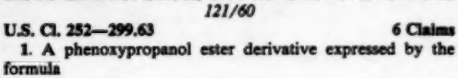
Filed Nov. 27, 1985, Ser. No. 803,215

Claims priority, application Japan, Nov. 28, 1984, 59-251328; Dec. 24, 1984, 59-272197

Int. Cl.[4] C09K *19/30, 19/12;* **C07C** *69/76, 69/74, 79/44, 101/02, 121/60*

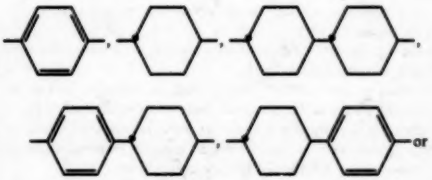
U.S. Cl. 252—299.63 **6 Claims**

1. A phenoxypropanol ester derivative expressed by the formula



(I)

wherein R^1 and R^2 each represent an alkyl group or an alkoxy group each of 1 to 15 carbon atoms, F atom, Cl atom or CN group, but either one of R^1 and R^2 is necessarily said alkyl group or alkoxy group; A represents



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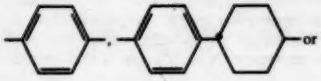
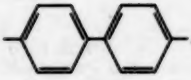
and B represents



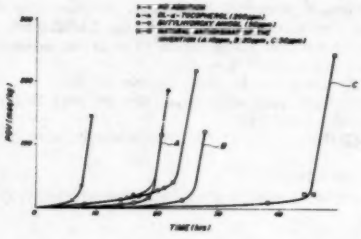


4,673,530

PROCESS FOR THE PRODUCTION OF A NATURAL ANTIOXIDANT OBTAINED FROM TEA LEAVES

Yukihiko Hara, Shizuoka, Japan, assignor to Mitsui Norin Co., Ltd., Tokyo, Japan

Filed May 22, 1984, Ser. No. 613,093
Claims priority, application Japan, May 30, 1983, 58-94069
Int. Cl.[4] C07D 311/04; C09K 15/34, 15/08
U.S. Cl. 252—398 18 Claims



1. A process for producing a natural antioxidant composed primarily of (−)-epigallocatechin gallate, (−)-epicatechin gallate, (−)-epigallocatechin and (−)-epicatechin from tea leaves selected from the group consisting of unfermented tea and half-fermented tea comprising:

treating said tea leaves with a solvent selected from the group consisting of hot water having a temperature of at least 40° C., a 40–75% aqueous solution of methanol, a 40–75% aqueous solution of ethanol and a 30–80% aqueous solution of acetone to obtain an extract-containing solution;

washing the extract-containing solution with chloroform to obtain a washed extract;

combining the washed extract with an organic solvent to transfer said washed extract into said organic solvent;

removing the organic solvent to provide an extract; and

drying said extract which is said natural antioxidant comprising said mixture of gallate compounds.

4,673,531

POLYCRYSTALLINE SILICON RESISTOR HAVING LIMITED LATERAL DIFFUSION

Ming-Kwang Lee, Hsin Chu, Taiwan, assignor to Industrial Technology Research Institute, Hsinchu, Taiwan

Continuation of Ser. No. 663,155, Oct. 22, 1984, abandoned, which is a division of Ser. No. 500,613, Jun. 3, 1983, Pat. No. 4,489,104. This application May 15, 1986, Ser. No. 864,555
Int. Cl.[4] H01B 1/06
U.S. Cl. 252—512 4 Claims

1. A polysilicon resistor containing a concentration of at least $10^{18}/cm^3$ of both p-type and n-type dopants, the concentration of one of said dopants being equal to or less than the concentration of the other, said p-type dopant being boron, aluminum, gallium or indium, said n-type dopant being phosphorus, antimony or arsenic, and said resistor having a low activation energy and a sheet resistivity of 10^8–10^{10} ohms/-square.

4,673,532

ROSIN-FREE SOLDER COMPOSITION

Felix Barajas, Huntington Beach, and Donald W. Bridges, Irvine, both of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Jan. 22, 1986, Ser. No. 821,231
Int. Cl.[4] A01B 1/06
U.S. Cl. 252—512 14 Claims

1. A solder composition especially adapted for soldering components in electronic circuits, which comprises 85 to 90% of finely divided solder metal and 10 to 15% of a perfluorinated trialkyl amine containing from 4 to 8 carbon atoms, by weight of the sum of the two components, and which alkylamine is semi-solid at room tempeature and confers a creamy consistency on the composition at room temperature, said composition being free of rosin flux.

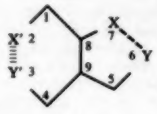
4,673,533

OXOBICYCLONONANE DERIVATIVES, PROCESS FOR PRODUCING SAME AND ORGANOLEPTIC USES THEREOF

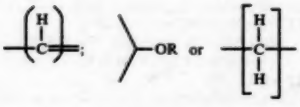
Richard M. Boden, Ocean, and John R. Helm, East Keansburg, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 796,430, Nov. 8, 1985, Pat. No. 4,634,547, which is a continuation-in-part of Ser. No. 763,569, Aug. 8, 1985, Pat. No. 4,608,194. This application Jun. 27, 1986, Ser. No. 879,417
The portion of the term of this patent subsequent to Aug. 26, 2003, has been disclaimed.
Int. Cl.[4] A61K 7/46
U.S. Cl. 252—522 R 5 Claims

1. A mixture of bicyclic compounds defined by the structure:

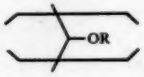


wherein X, Y, X' and Y' each represents the moiety having one of the structures:



wherein one of the dashed lines represents a carbon-carbon single bond and the other of the dashed lines represents a carbon-carbon double bond with the proviso that when X' and Y' are each the moiety:

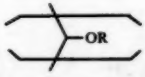
then the dashed line at the "2–3" position is a carbon-carbon double bond and the dashed line at the "6–7" position is a carbon-carbon single bond and one of X or Y has the structure:



and the other of X or Y has the structure:

and with the further proviso that when X and Y are the moieties:

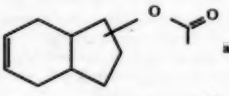
then the dashed line at the "6–7" position is a carbon-carbon double bond and the dashed line at the "2–3" position is a carbon-carbon single bond and one of X' or Y' has the structure:



and the other of X' or Y' has the structure:

and wherein R represents C_2–C_3 acyl.

2. A mixture of compounds defined accordig to the structures:



and

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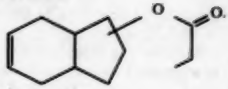


3. A process for augmenting or enhancing the aroma of a perfume composition comprising the step of intimtely admixing with said perfume composition, an aroma augmenting or enhancing quantity of the mixture defined according to claim 2.

4,673,534

CARNITINE SALTS PARTICULARLY SUITABLE FOR ORAL USE

Federico Gennari, Truccazzano, Italy, assignor to Bioresearch SpA, Liscate, Italy

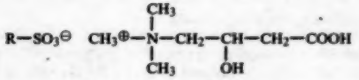
Filed Jun. 26, 1986, Ser. No. 878,698

Claims priority, application Italy, Jul. 5, 1985, 21445 A/85

Int. Cl.[4] C07C *143/34*

U.S. Cl. 260—501.12 **10 Claims**

1. Carnitine salts with sulphonic acids, characterised by the general formula:



(I)

in which R is a linear or branched alkyl chain of 8 to 18 carbon atoms.

4,673,535

QUATERNARY AMMONIUM SALTS OF SULFONATED TRIARYLPHOSPHINES AND PROCESS FOR THE PRODUCTION THEREOF

Helmut Bahrmann, Hamminkeln; Boy Cornils, Dinslaken; Wolfgang Lipps, Oberhausen; Peter Lappe, Oberhausen, and Helmut Springer, Oberhausen, all of Fed. Rep. of Germany, assignors to Ruhrchemie Aktiengesellschaft, Fed. Rep. of Germany

Filed May 29, 1985, Ser. No. 738,868

Claims priority, application Fed. Rep. of Germany, Jun. 1, 1984, 3420493

Int. Cl.[4] C07C *87/30*

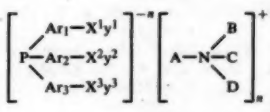
U.S. Cl. 260—501.15 **5 Claims**

1. A quaternary ammonium salt comprising

(a) a mono-, di-, or tri-sulfonated triaryl phosphine and

(b) a quaternary ammonium ion

wherein said salt is of Formula I



I

wherein Ar_1–Ar_3 are each phenyl; X^1–X^3 are each independently a sulfo group; y^1–y^3 are each independently 0 or 1, provided their sum is at least 1; A is benzyl or straight or branched C_{12}–C_{18} alkyl; B, C and D are each independently straight or branched alkyl having 1 to 4 carbon atoms; and n is 1, 2, or 3.

4,673,536

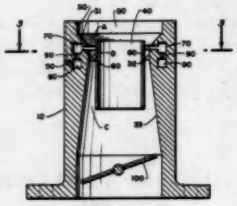
FUEL ADMIXTURE DEVICE

George Q. Morris, 3563 N. Quarzo Cir., Thousand Oaks, Calif. 91362

Continuation-in-part of Ser. No. 466,774, Feb. 15, 1983, abandoned. This application Oct. 25, 1984, Ser. No. 664,936

Int. Cl.[4] F02M *19/08*

U.S. Cl. 261—78.1 3 Claims



1. An apparatus for mixing fuel and air for supply to an internal combustion engine comprising;

carburetor body means having walls defining air inlet conduit means therein for flowing air to said engine;

said air inlet means having a venturi constriction portion disposed therein formed by configuring said air inlet conduit means to have a first convergent, then divergent cross-sectional configuration in the direction of air flowing through said inlet conduit;

booster cylinder means disposed in said air inlet conduit proximate said venturi constriction portion such that a peripheral venturi is defined between the outside of said booster cylinder and the venturi constriction portion of the walls of said air inlet means;

essentially annular supply channel means disposed about said air inlet conduit means;

essentially annular distribution channel means disposed about said air inlet conduit means;

transfer channel means connected to said supply channel means and connected to said distribution channel means;

fuel supply means connected to said distribution channel means for supplying metered fuel to said supply channel means;

fuel outlet means connected to said supply channel means and connected to said peripheral venturi proximate the most constricted portion thereof;

said fuel outlet means connecting to said peripheral venturi in an annular manner such that fuel flowing from said fuel outlet means into said peripheral venturi means is distributed into air flowing through said peripheral venturi means; and

said transfer channel means having predetermined flow capacity and predetermined location of connection to said supply channel means in order to distribute fuel into said supply channel means such that fuel is distributed from said fuel outlet means into said peripheral venturi means in an essentially symmetrical pattern.

4,673,537

TRAP FOR THE SUMP DRAIN OF AN EVAPORATIVE COOLER

Adam D. Goettl, 4960 E. Palomino Rd., Phoenix, Ariz. 85018

Filed Jun. 4, 1986, Ser. No. 870,405

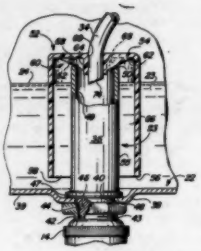
Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—97 17 Claims

1. A trap device for use with an evaporative cooler of the type having a sump in the bottom thereof for containment of an operational water supply and having an open overflow standpipe in the sump, said trap device comprising:

(a) a body of inverted cup-shaped configuration having a closed top end and an open bottom end;

(b) standoff means on said body for positioning said body in spaced substantially concentric relationship with the standpipe of the evaporative cooler with the closed top end of said body in upwardly spaced relationship with the top of the standpipe and the open bottom end of said body positioned between the bottom of the sump of the evaporative cooler and the normal water level line of the sump; and



(c) knock-out plug means located centrally in the closed top end of said body for selective removal to provide an opening through the closed top end of said body.

4,673,538

COOLING TOWER PANEL FROM FIBER CONCRETE OR SIMILAR MATERIAL

Heinrich Klauss, Bremen, and Kurt Baarsch, Achim, both of Fed. Rep. of Germany, assignors to Toschi Produktions-Gesellschaft mbH, Rethem, Fed. Rep. of Germany

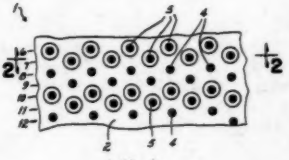
PCT No. PCT/EP85/00195, § 371 Date Dec. 30, 1985, § 102(e) Date Dec. 30, 1985, PCT Pub. No. WO85/05171, PCT Pub. Date Nov. 21, 1985

PCT Filed May 3, 1985, Ser. No. 817,736

Claims priority, application Fed. Rep. of Germany, May 4, 1984, 8413605[U]

Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—112 6 Claims



1. A cooling tower panel comprising

one surface having a plurality of lines of spaced points protruding out of the surface,

the other of said surfaces having a plurality of similar lines of depression within that surface,

each panel surface having a plurality of lines of points and also lines of depressions extending in an approximately parallel alignment one with the other, and

each panel surface having two corresponding lines of depressions on both sides of two immediately adjacent lines of points, both the points and the depressions of each line pair being offset relative to one another in the line direction, and the points and depressions alternating in a direction perpendicular to the line direction.

4,673,539

PROCESS FOR THERMOFORMED ARTICLES

W. James Hammar, St. Paul, and Ronald F. Ofstead, Maplewood, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 500,784, Jun. 3, 1983, abandoned. This application May 17, 1985, Ser. No. 735,379
Int. Cl.[4] B29D 11/00
U.S. Cl. 264—1.1 15 Claims

1. A process for preparing a hydrogel precursor ophthalmic shaped article comprising the step:

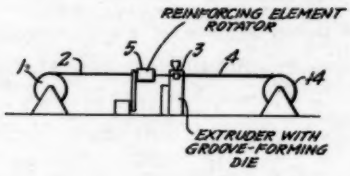
a. thermoforming an uncrosslinked polymer having a softening temperature of at least 100° C. comprising the product of an ethylenically-unsaturated monomer bearing at least one trihaloacetoxy-substituent group, by heating in a mold or pressing into sheets of films at a temperature in the range of 150° to 400° C. for 5 seconds to 15 minutes, and then cooling the resulting thermoformed polymer, to provide a thermoplastic, hydrogel precursor ophthalmic shaped article.

4,673,540

PROCESS AND APPARATUS FOR MANUFACTURING A CORE PROVIDED WITH OPEN HELICAL GROOVES FOR RECEIVING OPTICAL FIBERS

Antonio Portinari, Sesto San Giovanni, Italy, assignor to Societa' Cavi Pirelli S.p.A., Milan, Italy

Filed Dec. 12, 1985, Ser. No. 808,442
Claims priority, application Italy, Dec. 17, 1984, 24090 A/84
Int. Cl.[4] B29C 47/02; G02B 5/16
U.S. Cl. 264—1.5 8 Claims



1. A process for manufacturing a core for optical fiber cables, said core having an elongated traction, compression and torsion resistant reinforcing element surrounded and contacted by a layer of a plastic material, the layer having at least one open, helical groove at its outer surface for receiving at least one optical fiber, said process comprising:

advancing said element through an extruder and extruding said plastic material around said element as said element is so advanced, said extruder having groove forming means for forming at least one groove in the plastic material extruded around said element; and

while said element is being advanced through said extruder, alternately rotating said element around its longitudinal axis in advance of and before the extrusion of the plastic material around said element by frictionally engaging the exterior surface of said element and alternately rotating said element around its longitudinal axis.

3. Apparatus for manufacturing a core for optical fiber cables, said core having an elongated traction, compression and torsion resistant reinforcing element surrounded and contacted by a layer of plastic material, the layer having at least one open, helical groove at its outer surface for receiving at least one optical fiber, said apparatus comprising:

an extruder for extruding said plastic material around said element, said extruder having an entrance side for receiving said element and an exit side from which the element with said plastic material therearound exits and said extruder having groove forming means therein for forming at least one groove in the plastic material extruded around said element;

advancing means for advancing said core and for advancing said element into the entrance side of and through said extruder; and

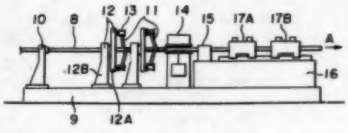
rotatable means in advance of the entrance side of said extruder for frictionally engaging the exterior surface of said element before said plastic material is extruded therearound and alternately rotating said element in opposite directions around its longitudinal axis.

4,673,541

METHOD AND APPARATUS FOR CONTINUOUS SHAPING OF CARBON-FIBER-REINFORCED PLASTIC TUBES

Takahiko Watanabe; Toshiyuki Sugano; Yasushi Yamamoto, and Kunihiko Murayama, all of Amagasaki, Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

Filed Feb. 27, 1986, Ser. No. 833,271
Claims priority, application Japan, Mar. 2, 1985, 60-40318
Int. Cl.[4] B29C 35/10
U.S. Cl. 264—25 13 Claims



1. A method for continuous shaping of carbon-fiber-reinforced plastic tubes having a wall thickness of 0.5 mm or less, which comprises steps of:

(a) supporting a rod-like mandrel for forming a tube so as to be movable in its longitudinal direction;

(b) laminating carbon fiber prepreg in tape form impregnated with a thermosetting resin on and around said mandrel;

(c) preheating said laminate provided on said mandrel;

(d) providing a hot die having an insertion part through which said mandrel having said preheated laminate is passed; and

(e) pulling said preheated laminate in and through said hot die together with said mandrel, during which it is gelled, cured, and shaped into the carbon-fiber-reinforced plastic tubes, said pulling operation being done continuously by alternate operations of a first grasping means and a second grasping means, wherein said first and second grasping means, which respectively have gripping members for gripping or releasing said mandrel with said laminate of the prepreg of tape form and are disposed so as to be movable in the axial direction of said mandrel, carry out said pulling step by the movement in the axial direction while said mandrel is gripped by said gripping member, and wherein the pulling force of the second grasping means is generated, while the pulling force of the first grasping means still remains, and completing gellation of said laminate at the former half part of said hot die.

10. An apparatus for continuous shaping of carbon-fiber-reinforced plastic tubes having a wall thickness of 0.5 mm or less, which comprises in combination:

(a) a rod-like mandrel for forming tube, which is supported being movable in its axial direction;

(b) means for laminating carbon fiber prepreg in tape form impregnated with a thermosetting resin in synchronism with a moving speed of said mandrel;

(c) means for preheating said prepreg laminated on and around said mandrel;

(d) a hot die for gelling and curing said preheated prepreg forwarded thereinto together with said mandrel, and for

shaping the same into the carbon-fiber-reinforced plastic tubes, said hot die being constructed with a resin squeezing zone, a resin gelling zone, and a resin curing zone, each of said zones being temperature-controlled individually and separately;

(e) first and second grasping means for gripping and pulling said shaped product from said hot die together with said mandrel;

(f) first and second detectors for detecting the pulling force of each of said grasping means; and

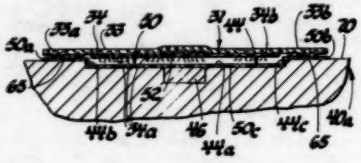
(g) pull-out drive means having a controller for generating the pulling force of said second grasping means, while said first grasping means still retains its pulling force, on the basis of the pulling force as detected by said first and second detectors.

4,673,542

METHOD OF MAKING A FOAMED SEAT OR CUSHION HAVING INTEGRAL FASTENERS

Lauren R. Wigner, Sterling Heights, and Zoltan I. Pandak, Utica, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 14, 1985, Ser. No. 744,760
Int. Cl.[4] B29C *67/18*
U.S. Cl. 264—46.7 **5 Claims**



1. The method of making a cushion for a seat which has a hook or loop strip fastener means molded to its exterior surface comprising the steps of:

(1) providing a mold having a pair of members which are relatively movable between open and closed positions and which together define a mold cavity and with the member defining the exterior surface of the cushion being provided with an elongated recess whose bottom lies over an elongated magnet located in the mold,

(2) providing an elongated fastener strip assembly comprising a thin plastic liner whose width is wider than the recess in the mold, a fastener strip means having a fastener strip with integral hook or loop fasteners facing toward the liner and whose width is less than the width of said recess and a backing whose width is greater than the fastener strip and approximately the same as the width of the liner and with adjacent side edge portions of the backing and liner being adhesively secured to each other and an elongated, thin steel strip located between the backing and said liner and whose width is less than the width of said recess whereby said fastener strip and said thin steel strip are sandwiched between said liner and said backing and isolated from direct contact exteriorly of said fastener strip assembly,

(3) placing and laying said fastener strip assembly liner side down into said recess of the mold so that the side edge portions of the liner and backing overlie the interior surface of the mold cavity and the steel strip overlies said magnet whereby said magnet by magnetic attraction will hold said fastener means within said recess and said fastener strip assembly in place in the mold cavity,

(4) adding foam material into the mold after it is closed to form said cushion and whereby said backing of said fastener strip assembly will be secured to said cushion,

(5) opening the mold and removing said formed cushion with the fastener strip assembly being secured to the exterior side of said cushion and with the liner facing exteriorly of said cushion.

4,673,543

METHOD OF PRODUCING HARDENED INORGANIC PRODUCTS

Tamotsu Akasaka; Shinichi Tomiuchi; Kazuo Seto; Kenichi Matsui, and Yasushi Sawada, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Continuation of Ser. No. 497,904, May 25, 1983, abandoned.
This application Feb. 5, 1986, Ser. No. 827,223
Int. Cl.[4] B28B *5/02*
U.S. Cl. 264—82 **10 Claims**

1. A method of producing a hardened inorganic product characterized by:

admixing a hydraulic material comprising slag as an effective component, gypsum, MSH and water, the proportion of said hydraulic material comprising slag as an active component, said gypsum and said MSH being set such that the amount of TSH to be generated is 5 to 50% by weight in hardened product matrix and such that the weight ratio of said gypsum to said MSH is between 0.7 to 10;

shaping said mixture; and

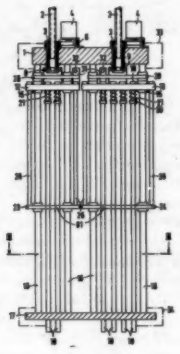
aging said shaped product in a humid atmosphere keeping the temperature of the product at about 50° to 100° C. to simultaneously generate TSH from said gypsum and MSH and hydrate the slag to harden the product.

4,673,544

PUSHING DEVICE FOR SLIDING FUEL RODS OUT OF A NUCLEAR REACTOR FUEL ASSEMBLY

Franz Rohr, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Feb. 16, 1984, Ser. No. 580,693
Claims priority, application Fed. Rep. of Germany, Sep. 2, 1983, 3331761
Int. Cl.[4] G21C *19/10, 19/12*; B65G *25/08*
U.S. Cl. 376—261 **19 Claims**



1. In a nuclear reactor installation having a fuel assembly with spacers holding a multiplicity of nuclear fuel rods disposed parallel to one another in a geometric array, a pushing device for simultaneously sliding from the spacers a plurality of fuel rods disposed in a pattern, said pushing device comprising:

a plurality of axially movable push rods equal in number to the plurality of fuel rods to be simultaneously removed from the spacers, said push rods being disposed parallel to each other in the pattern in which said plurality of fuel rods is arranged;

first mounting means including a pressure plate secured to said push rods at one end thereof for supporting said push

rods and further including a guide plate disposed at an opposite end of said push rods in a disengaged state of the pushing device for guiding said push rods during operating of said pushing device, said guide plate having a plurality of bores at least equal in number to said push rods and with substantially the same cross sectional area and shape as said push rods, said bores being disposed in the same pattern as said push rods, said push rods traversing said bores;

second mounting means, including a base plate on a side of said pressure plate opposite said guide plate and guide rods secured to said base plate and said guide plate, for slidably securing said pressure plate for motion in a direction parallel to said push rods;

third mounting means connected to said base plate and said guide plate for supporting same in an operating position juxtaposed to the fuel assembly;

drive means operatively connected to said base plate and said pressure plate for moving said pressure plate relative to said base plate, thereby sliding said plurality of fuel rods from said spacers by means of said plurality of push rods; and

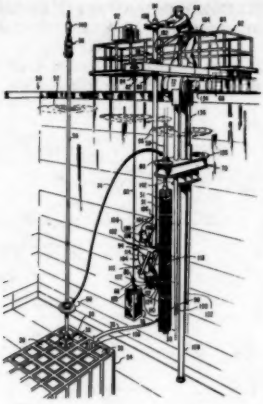
locking means connected to said push rods for preventing motion of at least any one push rod upon the exceeding of a threshold pressure by the force transmitted by said one push rod.

4,673,545

REMOTELY CONTROLLED APPARATUS FOR REMOVING CLIPS FROM IRRADIATED NUCLEAR FUEL ASSEMBLIES

William R. Cooke, Spokane; Brian G. Haugen, Richland, and Adolfo Reparaz, Kennewick, all of Wash., assignors to Advanced Nuclear Fuels Corporation, Florham Park, N.J.

Filed Nov. 6, 1984, Ser. No. 668,635
Int. Cl.[4] G21C *19/00, 19/32*
U.S. Cl. 376—261 **17 Claims**



1. In a nuclear plant facility having irradiated clips securing together a plurality of fuel rods of an irradiated nuclear fuel rod assembly contained underwater in a tank, a clip removing apparatus comprising:

a tool having:

a frame;

first and second substantially parallel fuel rod support means secured to said frame for supporting portions of said fuel rods located above and below a clip to be removed;

first and second cams on opposing faces of said first and second fuel rod support means;

first and second jaws each having an outer surface profiled for interaction with said first and second cams, respectively;

jaw support block means slideably located between said first and second fuel rod support means for providing opposed pivotal mounting of said first and second jaws to permit said first and second jaws to pivot between open and closed positions as said block means is moved between forwardmost and rearwardmost positions relative to said first and second fuel rod support means; and

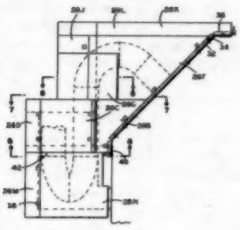
jaw actuator means connected between said jaw support block means and said frame, remotely operable for selectively moving said jaw support block means between forwardmost and rearwardmost positions, whereby with said tool prepositioned with a clip to be removed between said first and second fuel rod support means, and said block means in a forwardmost position, and said first and second jaws open over the top and bottom edges of said clip, respectively, said jaw actuator means is operated to move said block means rearward, causing said first and second jaws to pivot closed for grasping said clip, and thereafter pulling said clip free of said fuel assembly as said block means continues to move rearward.

4,673,546

PRESSURIZER LOOP SEAL INSULATION ASSEMBLY

Lynn A. Casteen, Lancaster; Kim T. Gilbert, Columbus; Raj L. Patel, and Steven R. Snoke, both of Lancaster, all of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Mar. 30, 1984, Ser. No. 595,173
Int. Cl.[4] G21C *9/00*
U.S. Cl. 376—289 **4 Claims**



1. In a pressurized water nuclear reactor system of the type having a pressurizer, a safety valve, and an uninsulated loop seal pipe connecting the pressurizer and safety valve, the loop seal pipe having a first end communicating with the pressurizer to define a loop seal pipe/pressurizer interface and a second end communicating with the safety valve to define a loop seal pipe/safety valve interface, means for raising temperature at the loop seal pipe/safety valve interface comprising a plurality of thermally insulated panels interconnected to form a housing enclosing at least a portion of the loop seal pipe proximate the pressurizer and a portion of the pressurizer proximate the first end of the loop seal pipe, the said portion of the pressurizer having an uninsulated outer surface exposed to the loop seal pipe within the housing so that heat can be transferred from the outer surface to the loop seal pipe.

4,673,547

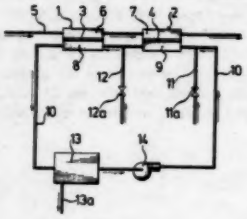
PROCESS FOR SEPARATION OF HYDROGEN AND/OR DEUTERIUM AND TRITIUM FROM AN INERT GAS FLOW AND APPARATUS FOR EFFECTUATION OF PROCESS IN THE COOLING GAS CIRCUIT OF A GAS-COOLED NUCLEAR REACTOR

Nicolaos Iniotakis, Julich; Claus-Benedict von der Decken, Aachen; Rudolf Hecker, Julich; Werner Fröhling, Duren, and Rudolf Schulten, Aachen, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Fed. Rep. of Germany

Division of Ser. No. 381,346, May 24, 1982. This application Mar. 1, 1985, Ser. No. 707,087

Int. Cl.[4] G21C *19/02;* G21F *9/02*

U.S. Cl. 376—314 9 Claims



1. In an arrangement for the separation of hydrogen and/or deuterium and tritium from an inert gas flow which is contaminated with hydrogen and/or deuterium and tritium in the cooling gas circuit of a gas cooled nuclear reactor, including a gas purifying installation having means for the separation of water and which is connected through a bypass conduit with a through-flow regulator to the cooling gas circuit, and a return conduit being connected at the outlet of the gas purifying installation and leading to the cooling gas circuit; the improvement comprising: including at least one exchange arrangement in the cooling gas circuit having at least one exchange wall for hydrogen isotopes, a first flow chamber traversed by the cooling gas of the cooling gas circuit on the primary side of the exchange wall, and a second flow chamber on the secondary side in which, as viewed in the flow direction of the cooling gas said bypass conduit is connected downstream of the exchange arrangement with an inlet conduit for an agent which chemically reacts with the hydrogen isotopes permeating through the exchange wall and bonds the hydrogen isotopes which are to separated from the purified inert gas flow or the hydrogen isotopes which are to separated into a reaction product transportable in a gas flow which is not permeable through the exchange wall, said bypass conduit being conducted from the outlet of the secondary side flow chamber to the inlet of the gas purifying installation.

4,673,548

THERMAL BARRIER AND SUPPORT FOR NUCLEAR REACTOR FUEL CORE

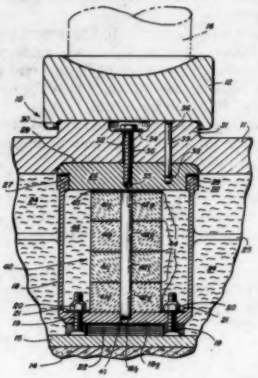
William S. Betts, Jr.; J. Larry Pickering, both of Del Mar, and William E. Black, San Diego, all of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 31, 1984, Ser. No. 646,312

Int. Cl.[4] G21C *13/04*

U.S. Cl. 376—362 4 Claims

1. In a nuclear reactor having a thermal barrier for supporting a fuel column of a nuclear reactor core within a reactor vessel having a fixed rigid metal liner, the fuel column having a refractory post extending downwardly therefrom, the thermal barrier comprising, in combination, a metallic core support having an interior chamber secured to the metal liner; fibrous thermal insulation material covering the metal liner and surrounding the metallic core support; means associated with the metallic core support and resting on the top thereof for locating and supporting the full column post; and a column of ceramic material located within the interior chamber of the metallic core support, the height of the column being less than the height of the metallic core support so that the ceramic column will engage the means for locating and supporting the



fuel column post only upon plastic deformation of the metallic core support; the core support comprising a metallic cylinder and the ceramic column comprising a plurality of coaxially aligned ceramic pads, each pad having a hole therethrough and being located within the metallic cylinder by means of a ceramic post passing through the holes in the pads.

4,673,549

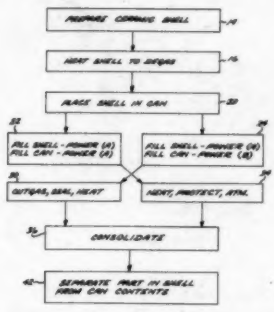
METHOD FOR PREPARING FULLY DENSE, NEAR-NET-SHAPED OBJECTS BY POWDER METALLURGY

Gunes Ecer, 123 Honeycomb Ct., Encinitas, Calif. 92024

Filed Mar. 6, 1986, Ser. No. 836,978

Int. Cl.[4] B22F *7/00*

U.S. Cl. 419—10 26 Claims


PREPARE CONTAINER SHELL
FILL SHELL TO DESIRED
PLACE SHELL IN CAN
FILL SHELL - POWDER (A)
FILL CAN - POWDER (A)
FILL SHELL - POWDER (B)
FILL CAN - POWDER (B)
OUTGAS, SEAL, HEAT
HEAT, PROTECT, ATM.
CONSOLIDATE
SEPARATE PART IN SHELL FROM CAN CONTENTS

1. A process for manufacturing objects by consolidation of powdered materials of the type capable of being consolidated in powder metallurgy processes, the process comprising the steps of:

filling a shell with a first powder composition of the type capable of being consolidated in powder metallurgy processes, the first powder composition having a predetermined compressibility ratio, the shell being placed inside a can so that space is located between the shell and the can;

filling the space between the shell and the can with a second

powder composition of the type capable of being consolidated in powder metallurgy processes, the second powder composition having substantially the same compressibility ratio as the first powder composition;

subjecting the can together with the shell included therein to elevated temperature and a pressure applied in one longitudinal direction only, the pressure and temperature being of sufficient magnitude to consolidate the first and second powder compositions, the shell being of a material which does not bond to the first powder composition, and

disassembling the can and the shell which has been compacted in one direction as a result of the applied pressure to obtain an object consolidated from the first powder composition.

4,673,550

TiB_2-BASED MATERIALS AND PROCESS OF PRODUCING THE SAME

Serge Dallaire, 409 Gardenville, Longueuil, Quebec, Canada J4H 2H5, and Blaise Champagne, 322 Dechamps, Boucherville, Quebec, Canada J4B 6N7

Continuation of Ser. No. 663,941, Oct. 23, 1984, abandoned. This application Sep. 24, 1986, Ser. No. 910,859

Int. Cl.[4] B22F *1/00*

U.S. Cl. 419—12 **3 Claims**

1. A process of preparing composite materials consisting of fine TiB_2 crystals dispersed in a metallic phase, said metallic phase containing at least 32.6 wt % TiB_2, which comprises providing a mixture consisting essentially of titanium bearing alloys and boron, said titanium bearing alloys containing at least 25 wt % titanium and a member selected from the group consisting of Fe, Ni, Co, Al, Mo, Cr, Cu and mixtures thereof, initiating an exothermic reaction in said mixture at a temperature below the melting points of said titanium bearing alloys and said boron, to give fine TiB_2 crystals dispersed in a metallic phase, said metallic phase being derived from metallic elements previously alloyed with titanium.

4,673,551

FIN STOCK MATERIAL FOR USE IN PLATE FIN HEAT EXCHANGER ADAPTED FOR SUPERHIGH PRESSURE SERVICE

Yoshihiko Sugiyama, Kasugai; Keizo Nanba; Michiki Hagiwara, both of Nagoya; Takeshi Aoki, Takatsuki; Shosuke Iwasaki, Hyogo, and Tetsuo Abiko, Osaka, all of Japan, assignors to Sumitomo Light Metal Industries, Ltd., Tokyo and Sumitomo Precision Products Co., Ltd., Amagasaki, both of, Japan

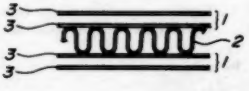
Filed Mar. 7, 1985, Ser. No. 709,002

Claims priority, application Japan, May 25, 1984, 59-104457

The portion of the term of this patent subsequent to Mar. 11, 2003, has been disclaimed.

Int. Cl.[4] C22C *21/00*

U.S. Cl. 420—535 **4 Claims**



1. A fin stock material for use in a plate fin heat exchanger fabricated by brazing, adapted for superhigh pressure service, said fin stock material being made of an aluminum alloy consisting essentially of, in weight percentages, 0.6 to 1.5% Mn, 0.1 to 1.0% Cu, 0.1 to 0.75% Mg, 0.05 to 0.25% Zr, 0.05 to less than 0.30% Si, up to 0.8% Fe, and the balance comprising aluminum and incidental impurities.

4,673,552

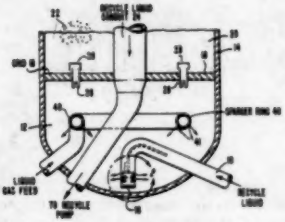
DOWNWARDLY DIRECTED FLUID FLOW DISTRIBUTION SYSTEM FOR EBULLATED BED REACTOR

Allen S. Li, Morristown; Richard M. Eccles, Princeton, and Lloyd M. Ruef, Clark, all of N.J., assignors to Hydrocarbon Research, Inc., Lawrenceville, N.J.

Continuation of Ser. No. 416,429, Sep. 9, 1982, abandoned. This application May 3, 1985, Ser. No. 730,255

Int. Cl.[4] B01J *8/20*

U.S. Cl. 422—140 **15 Claims**



1. In a reactor containing an ebullated bed, with the reactor further comprising means defining a lower end and at least one side wall means wherein the improvement comprises a fluid flow distribution system for providing a uniform flow distribution of a fluid material mixture upwardly into the ebullated bed of the reactor comprising:

(a) a plenum provided in a lower part of the reactor and defined by the lower end and the at least one side wall of the reactor and also by a distribution grid located below and supporting the ebullated bed in the reactor, said distribution grid having a plurality of vertical tubes extending therethrough, wherein each of said vertical tubes have an upper end which is covered by a cap and a lower end which extends below the distribution grid into the plenum;

(b) a conduit extending through said at least one side wall downwardly into said plenum for carrying a flowable fluid material initially downwardly into the plenum; and

(c) a baffled nozzle located in a lower end of said plenum and rigidly attached in flow relationship with said conduit, said baffled nozzle being downwardly directed in the plenum and located below said distribution grid by a distance equal to 3–9 times the inner diameter of said conduit, said baffled nozzle having at least two baffles spaced apart from each other, including a first upstream baffle plate having means defining a central opening therein, and a second downstream baffle plate consisting of a solid plate, whereby said baffled nozzle mixes a gas and a liquid material fed through said conduit into said plenum and is so arranged and located in combination with said distribution grid to effect a substantially uniform mixing and flow distribution of the gas/liquid mixture upwardly into said ebullated bed.

4,673,553

METAL HONEYCOMB CATALYST SUPPORT HAVING A DOUBLE TAPER

William B. Retallick, West Chester, Pa., assignor to Camet, Inc., Hiram, Ohio

Filed Sep. 8, 1986, Ser. No. 905,071

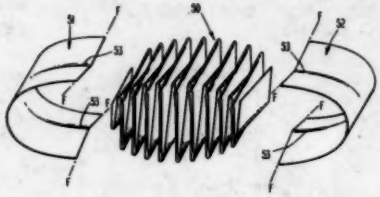
Int. Cl.[4] B01J *8/02, 35/04*

U.S. Cl. 422—180 **9 Claims**

1. A catalytic converter for an automobile, comprising a strip of metal folded back and forth upon itself, the lines of folding being inclined from the perpendicular to the longitudinal axis of the strip, the repeating sequence of the inclinations being left, right, right, left, throughout the strip so that the folded strip has a taper in both of two directions, and a canister

section, the canister section being shaped to coincide with the shape of the folded strip, the canister section having tapers which mate with the tapers on the folded strip, the canister section being wrapped around the folded strip so as to maintain the strip in a fixed position.

5. A catalytic converter for an automobile, comprising a strip of metal folded back and forth upon itself, the strip being



folded along fold lines, the fold lines being inclined from the perpendicular to the longitudinal axis of the strip, the repeating sequence of the inclinations being left, right, right, left, throughout the strip and an anchoring means having a contour which generally coincides with the contour of the folded strip, the anchoring means being attached to the folded strip so as to prevent the folds of the folded strip from telescoping.

4,673,554

METHOD OF PURIFYING TANTALUM

Kenji Niwa, and Ichiro Ichikawa, both of Chiba, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Dec. 13, 1985, Ser. No. 808,767
Claims priority, application Japan, Dec. 18, 1984, 59-267029
Int. Cl.[4] C01G *35/00*
U.S. Cl. 423—63 11 Claims

1. A method for obtaining high-purity tantalum pentoxide comprising the following steps:

dissolving a crude tantalum-containing compound in an acid containing hydrofluoric acid;

mixing and bringing the resulting acidic aqueous solution of the crude tantalum-containing compound into contact with an organic solution composed of a water-insoluble quaternary ammonium compound and a water-insoluble organic solvent, to extract the tantalum from said acidic aqueous solution into said organic solution;

mixing said organic solution with an aqueous solution containing at least one compound selected from the group consisting of an inorganic acid and an ammonium salt, to remove any of the impurities that have partly been extracted into said organic solution together with tantalum from said organic solution;

converting the tantalum in said organic solution to tantalum hydroxide by treatment with an alkali containing ammonium hydroxide; and

precipitating said tantalum hydroxide and separating it, followed by calcining it to obtain high-purity tantalum pentoxide.

4,673,555

METHOD FOR PREPARATION OF DEFLUORINATED PHOSPHATE

Edward A. White, 2250 Greenfield Dr., Glenview, Ill. 60025

Filed Aug. 16, 1984, Ser. No. 641,443
Int. Cl.[4] C01B *25/16*
U.S. Cl. 423—167 8 Claims

1. A method for reducing the fluorine content of phosphate rock comprising:

blending the rock with water and an amount of phosphoric acid and a sodium defluorinating reagent sufficient to give 5 to 9 percent Na_2O based on the weight of the rock and a mole ratio of CaO plus Na_2O to P_2O_5 of about 3;

introducing the blend into a fluidized bed calcination apparatus having at least a first and second reaction zone, each of said zones being at a temperature above about 1050° C.;

calcining the blend in the first zone in the presence of water vapor or optionally air and water vapor to remove a major proportion of the fluorine from the blend, and

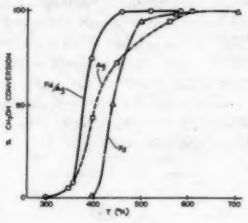
further calcining the blend in the subsequent zone or zones without substantial cooling of the blend between the first zone and the subsequent zone, said further calcining being carried out in the presence of water vapor and in an atmosphere containing air added in an amount in excess of that required for combustion and in excess, on a percentage basis, of that present in the first zone, said amount being sufficient to reduce the fluorine content of the blend to a value of less than about 0.18 weight percent while maintaining the phosphorus to fluorine weight ratio in excess of about 100.

4,673,556

METHOD OF SIMULTANEOUS OXIDATION OF CARBON MONOXIDE AND UNBURNED FUEL IN METHANOL VEHICLE EXHAUST

Robert W. McCabe, Lathrup Village, and Patricia J. Mitchell, Troy, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 8, 1985, Ser. No. 796,107
Int. Cl.[4] B01D *53/36*
U.S. Cl. 423—213.5 1 Claim



1. A method of treating exhaust gases from an internal combustion engine burning methanol fuel by simultaneously oxidizing the unburned methanol and carbon monoxide contained in said exhaust gases, said method comprising the step of passing said exhaust gases over a catalyst system consisting essentially of 5 weight percent silver and 0.01 weight percent palladium dispersed on a substrate, whereby said palladium is finely dispersed in and in initimate contact with said silver to simultaneously oxidize unburned methanol and carbon monoxide into carbon dioxide and water.

4,673,557

PROCESS FOR REMOVING HYDROGEN SULFIDE FROM GASES

Martin J. P. C. Nieskens, and Ramalinga Ramamurthy, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Mar. 26, 1985, Ser. No. 716,266
Claims priority, application United Kingdom, Mar. 27, 1984, 8407842
Int. Cl.[4] C01B *17/16, 31/20*
U.S. Cl. 423—230 10 Claims

1. A process for removing hydrogen sulfide from a sour gaseous stream comprising contacting the hydrogen sulfide-containing stream with a solid absorbent comprising an intimate mixture of zinc oxide and a zeolite having a pore size larger than 0.40 nm and wherein the solid absorbent comprises

more than 50 percent by weight of zinc oxide, at a temperature above 300° C.

4,673,558

METHOD FOR TREATING A WASTE GAS

Makoto Senoue, Funabashi; Kunihiko Terase, Tokyo, and Keiichi Nakaya, Chiba, all of Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Filed Sep. 4, 1985, Ser. No. 772,431
Claims priority, application Japan, Sep. 4, 1984, 59-183637
Int. Cl.[4] B01D 53/34
U.S. Cl. 423—240 6 Claims

1. A method for treating a waste-gas containing a fluorine component and/or a chlorine component, which comprises:

contacting the waste gas with magnesium oxide particles which have a specific surface area of from 100 to 200 m^2/g and a particle size ranging from 0.5 to 10 mm.

4,673,559

SILICOALUMINOPHOSPHATE CRYSTALLIZATION USING HYDROLYSIS

Eric G. Derouane, Namur, Belgium, and Roland von Ballmoos, Pennington, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 562,673, Dec. 19, 1983, abandoned. This application Dec. 21, 1984, Ser. No. 685,171
Int. Cl.[4] C01B 33/28
U.S. Cl. 423—306 15 Claims

1. A method for synthesizing crystalline silicophosphoaluminate, which method comprises:

(1) providing a reaction mixture comprising water, sources of aluminum oxide, silicon oxide, and phosphorus oxide, one of the said oxide sources being unstable in the water, an organic directing agent A, inorganic cations M and anions N, and a substantially water-immiscible organic solvent for the said oxide source unstable in the water, the components of said reaction mixture having the following relationship:

$$(A)_a:(M_2O)_b:(Al_2O_3)_c:(SiO_2)_d:(P_2O_5)_e:(\text{Solvent})_f:(N)_g:(H_2O)_h$$

wherein a, b, c, d, e, f, g and h are numbers satisfying the following relationships:

a/(c+d+e) is less than 4,
b/(c+d+e) is less than 2
d/(c+e) is less than 2,
f/(c+d+e) is from 0.1 to 15,
g/(c+d+e) is less than 2, and
h/(c+d+e) is from 3 to 150,

wherein upon initial provision of said reaction mixture the said oxide source unstable in the water is dispersed or dissolved in the water-immiscible organic solvent;

(2) heating said reaction mixture at a rate of from 5° C. to 200° C. per hour to a temperature of from 80° C. to 300° C.;

(3) agitating said reaction mixture in a manner sufficient to intimately admix the water-immiscible organic solvent and the water with each other, thereby progressively hydrolyzing the oxide source unstable in water;

(4) maintaining said agitated reaction mixture at a temperature of from 80° C. to 300° C. and a pH of from 2 to 9 until crystals of silicophosphoaluminate material are formed; and

(5) recovering from said reaction mixture silicophosphoaluminate material characterized by a composition, in the anhydrous state, as follows:

$$A'_v:M_{x/m}^{m+}:(AlO_2)_{1-y}^{-}:(PO_2)_{1-x}^{+}:(SiO_2)_{x+y}:N_{y-n}^{n-}$$

wherein A′ represents the total of organic directing agent A plus organic solvent, v is the number of moles of A′, m is the valence of cation M, n is the valence of anion N, and x and y are numbers of from greater than −1 to less than +1 which satisfy the relationships:

(1) if x is 0, the y is not 0,
(2) if y is 0, then x is not 0,
(3) if the atomic ratio of Al/P is greater than 1, then (x+y) is greater than 0 and y+0.6x is less than 0.4, and
(4) if the atomic ratio of Al/P is less than 1, then (x+y) is greater than 0 and 0.5 is greater than 0.5 y+x,

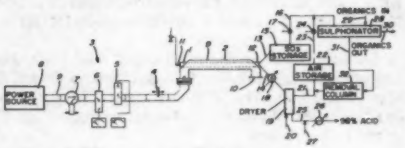
said silicophosphoaluminate having an ion exchange capacity of at least about 0.002 meq/g.

4,673,560

GENERATION OF SULPHUR TRIOXIDE FROM OLEUM USING MICROWAVE ENERGY

Gary M. J. Masse, Burlington, and Anthony C. F. Edmonds, North York, both of Canada, assignors to C-I-L Inc., North York, Canada

Continuation-in-part of Ser. No. 703,402, Feb. 20, 1985, abandoned. This application Aug. 30, 1985, Ser. No. 771,054
Int. Cl.[4] C01B 17/74, 17/98; H05B 6/64
U.S. Cl. 423—532 5 Claims



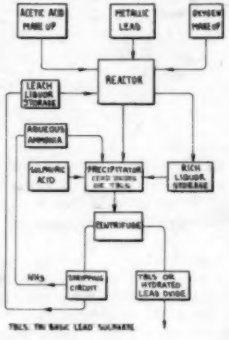
1. A process for the generation of sulphur trioxide comprising subjecting sulphur trioxide-rich oleum feed to microwave energy for a sufficient period of time to produce sulphur trioxide vapour and spent oleum; isolating said sulphur trioxide vapour and collecting said spent oleum.

4,673,561

PROCESS FOR THE MANUFACTURE OF HYDRATED OXIDES AND TRI- AND TETRA- BASIC LEAD SULPHATES

David Cox, North Sydney, Australia, assignor to Gasohol Energy Pty. Ltd., Australia

PCT No. PCT/AU85/00167, § 371 Date Mar. 3, 1986, § 102(e) Date Mar. 3, 1986, PCT Pub. No. WO86/00878, PCT Pub. Date Mar. 13, 1986
PCT Filed Jul. 25, 1985, Ser. No. 845,691
Claims priority, application Australia, Jul. 27, 1984, PG6262
Int. Cl.[4] C01G 21/02, 21/20
U.S. Cl. 423—559 10 Claims



1. A process for the manufacture of hydrated lead oxides in

the bivalent state characterized by the steps of (1) reacting metallic lead with acetic acid at a temperature up to 200° C. under an atmosphere of an oxygen containing gas of between 1 and 10 atmospheres absolute pressure to form lead acetate, then (2) reacting the lead acetate with a source of ammonium ion under an absolute pressure between 1 and 5 atmospheres at a temperature up to 100° C. to precipitate hydrated lead oxides.

7. A process for the manufacture of tri- and tetra-basic lead sulphates, characterized by the steps of (1) reacting excess metallic lead with an aqueous solution containing between 5% and 30% by weight of ammonium acetate at a temperature between 50° C. and 200° C. under an atmosphere of oxygen of between 1 and 10 atmospheres absolute pressure to form lead acetate, then (2) reacting the lead acetate so formed with ammonia under an absolute pressure between 1 and 5 atmospheres at a temperature between 15° C. and 100° C., preferably 60° C. to 90° C. to precipitate lead oxides, the (3) adding to the lead oxides so precipitated sulphuric acid in the stoichiometric amount to produce tri- or tetra-basic lead sulphate, then (4) separating and drying the tri- or tetra-basic lead sulphate so formed.

4,673,562
BISAMIDE BISTHIOL COMPOUNDS USEFUL FOR MAKING TECHNETIUM RADIODIAGNOSTIC RENAL AGENTS

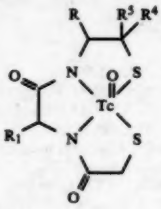
Alan Davison, Needham; David Brenner; John Lister-James, both of Cambridge, and Alun G. Jones, Newton Centre, all of Mass., assignors to The Children's Medical Center Corporation, Boston and Massachusetts Institute of Technology, Cambridge, both of, Mass.

Filed Aug. 19, 1983, Ser. No. 524,888

Int. Cl.[4] A61K *43/00*; **A61N** *5/12*; **C07F** *13/00*

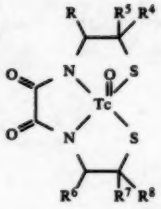
U.S. Cl. 424—1.1 **45 Claims**

2. A technetium complex having the structural formula:



III

or



IV

wherein R and R^6 are each selected from hydrogen; unsubstituted lower alkyl; substituted lower alkyl having each of its substitutents selected from the group consisting of halide, hydroxy, carboxylic acid or carboxamide; or —COR^9

where R^9 is selected from hydroxy; unsubstituted lower alkoxy, or substituted lower alkoxy having each of its substituents selected from the group consisting of halide, hydroxy, carboxylic acid or carboxamide; unsubstituted amino or substituted amino having each of its substituents chosen from the group consisting of lower alkyl or substituted lower alkyl having each of its substitutents selected from the group consisting of halide, hydroxy, carboxylic acid and carboxamide; and ammonium group or substituted ammonium group with a pharmacologically suitable anion; glycine ester or an activated leaving group;

R^1 is selected from hydrogen, unsubstituted lower alkyl, or substituted lower alkyl having each of its substituents selected from the group consisting of halide, hydroxy, carboxylic acid or carboxamide; and

R^4, R^5, R^7 and R^8 are each selected from hydrogen or lower alkyl;

and salts thereof.

26. A method for diagnosing kidney disfunction in a mammal comprising injecting into said mammal a technetium complex in accord with claim 2 in a suitable pharmacological carrier; and scanning the renal system of said mammal using radioscintigraphic imaging apparatus.

4,673,563
ADENOSINE IN THE TREATMENT OF SUPRAVENTRICULAR TACHYCARDIA

Robert M. Berne; Luiz Belardinelli, and Rafael Rubio, all of Charlottesville, Va., assignors to The University of Virginia Alumni Patents Foundation, Charlottesville, Va.

Continuation of Ser. No. 452,014, Dec. 21, 1982, abandoned, which is a continuation-in-part of Ser. No. 196,652, Oct. 14, 1980, Pat. No. 4,364,922. This application Apr. 8, 1985, Ser. No. 721,122

Int. Cl.[4] A61K *49/00, 31/70*

U.S. Cl. 424—9 **10 Claims**

1. A method of treating supraventricular tachycardia caused by re-entry in the AV node, comprising the steps of:

(a) administering intravenously to a human afflicted with the tachycardia, 0.01–0.25 mg/kg of body weight of adenosine sufficient to restore normal rhythm.

6. A method of diagnosing supraventricular tachycardia caused by re-entry in the AV node, comprising the steps of:

(a) administering intravenously to a human afflicated with the tachycardia 0.01–0.25 mg/kg of body weight of adenosine;

(b) monitoring the heart beat of said human for restoration of normal sinus rhythm; and

(c) determining the existence of the tachycardia.

4,673,564
SUSTAINED RELEASE PHARMACEUTICAL COMPOSITION OF SOLID MEDICAL MATERIAL

Hiroitsu Kawata; Masayoshi Aruga; Tadayoshi Ohmura; Takashi Sonobe; Satoru Yoneya, all of Saitama, and Chiharu Sone, Chiba, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 681,078, Dec. 13, 1984, abandoned, which is a continuation of Ser. No. 517,029, Jul. 25, 1983, abandoned, which is a division of Ser. No. 403,007, Jul. 29, 1982, Pat. No. 4,404,183, which is a division of Ser. No. 165,244, Jul. 2, 1980, Pat. No. 4,343,789. This application Oct. 23, 1985, Ser. No. 790,639

Claims priority, application Japan, Jul. 5, 1979, 54-85209; Mar. 22, 1980, 55-36514

Int. Cl.[4] A61K *31/74*

U.S. Cl. 424—494 **5 Claims**

1. A process for producing amorphous nicardipine or its salt which comprises friction-pulverizing crystalline nicardipine or its salt to a fine powder using a ball mill or a vibrating ball mill for a period of at least 10 to 16 hours whereby said crystalline nicardipine or its salt is converted to amorphous nicardipine or its salt.

4,673,565

PHARMACEUTICAL COMPOSITIONS CONTAINING HOLLOW FINE TUBULAR DRUG DELIVERY SYSTEMS

Robert C. Di Luccio, Wilmington, Del.; Ray B. Duggins, Chadds Ford, and Eli Shefter, Media, both of Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 3, 1985, Ser. No. 730,064
Int. Cl.[4] A61K 9/00
U.S. Cl. 424—443 16 Claims

1. A pharmaceutical composition comprising:

a pharmaceutically suitable carrier and at least one drug delivery system consisting essentially of (1) a plurality of polymeric tubes having thin outer membrane sheaths and hollow cores, the length of each tube independently in the range of about 0.5 mm to about 5 cm, and (2) at least one solid, nonvaporizable drug compound contained within the cores, said system contained in the composition in an amount sufficient to deliver a therapeutic amount of the drug contained therein at a predetermined rate over a predetermined period of time.

4,673,566

MICROENCAPSULATION OF LIVING TISSUE AND CELLS

Mattheus F. A. Goosen; Geraldine M. O'Shea, both of Toronto, and Anthony M. Sun, Willowdale, all of Canada, assignors to Connaught Laboratories Limited, Willowdale, Canada

Continuation-in-part of Ser. No. 501,445, Jun. 6, 1983, abandoned. This application May 24, 1984, Ser. No. 613,780
Claims priority, application Canada, Jun. 1, 1983, 429460
Int. Cl.[4] A61K 9/50, 37/00
U.S. Cl. 424—19 29 Claims

1. A microcapsule having a diameter of about 500 to about 2000 μm and suitable for implantation into an animal body, comprising:

a core comprising one or more viable, healthy, physiologically-active tissue cells capable of ongoing metabolism, and

a biocompatible semi-permeable membrane surrounding and enclosing said core, said semi-permeable membrane being permeable to tissue nutrients and metabolic products produced by the tissue but impermeable to immune system proteins, said semi-permeable membrane having a molecular weight cut-off of below about 150,000 daltons,

said biocompatible membrane being a hydrogel formed by ionic reaction between a polylysine polymer having a molecular weight from about 10,000 to about 30,000 daltons and a polymeric material bearing negatively-charged groups to provide an outer negatively-charged surface,

said polylysine polymer membrane having a durability sufficient to permit said microcapsules to be injected in the animal body and sufficient to maintain said microcapsules in an intact form and to permit said tissue to effect ongoing metabolism when injected into the animal body for a period of time exceeding three months.

10. A method of encapsulating a core material within a semi-permeable membrane to form microcapsules for implantation into an animal body, which comprises:

(a) placing the material in an aqueous solution of a water-soluble polymeric substance that can be reversibly gelled and which has free acid groups,

(b) forming the solution into droplets,

(c) gelling the droplets to produce discrete shape-retaining temporary capsules,

(d) forming semi-permeable membranes about the temporary capsules by contact between the temporary capsules and a polymer containing free amino groups to cause ionic reaction with the acid groups in a surface layer of the capsule, said polymer containing free amino groups being polylysine having a molecular weight of about 10,000 to about 30,000 daltons, said contact being effected for a period of time no less than about four minutes sufficient to provide a polymer coating on the temporary capsule of sufficient durability to permit the microcapsules to be injected into the animal body, and

(e) contacting said microcapsules formed in step (d) with a biocompatible polymeric material which contains free negatively-charged groups capable of ionic reaction with the free amino groups in a surface layer of the microcapsule, thereby to form an outer coating of said biocompatible polymeric material on said microcapsules.

4,673,567

PROCESS FOR PREPARING LIPOSOME COMPOSITION

Hiroaki Jizomoto, Osaka, Japan, assignor to Shionogi & Co., Ltd., Osaka, Japan

Filed Aug. 8, 1985, Ser. No. 763,785
Claims priority, application Japan, Aug. 16, 1984, 59-171265
Int. Cl.[4] B01J 13/02; A61K 9/52
U.S. Cl. 424—38 4 Claims

1. A process for preparing liposome compositions which comprises dispersing lyophilized multilamella vesicles or small unilamella vesicles in an aqueous medium in the presence of one or more clinically active ingredients at or over a temperature of the gel-phase/liquid crystal-phase transition.

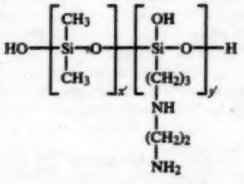
4,673,568

HAIR-CARE COMPOSITION AND HAIR TREATMENT PROCESS

Jean F. Grollier, Paris; Claude Dubief, Le Chesnay, and Daniele Cauwet, Paris, all of France, assignors to L'Oreal, Paris, France

Filed Dec. 31, 1984, Ser. No. 687,968
Claims priority, application Luxembourg, Apr. 13, 1984, 85303
Int. Cl.[4] A61K 7/06, 7/09, 9/12
U.S. Cl. 424—47 20 Claims

1. A cosmetic composition for hair care comprising at least one water-dispersible cationic surfactant in proportions of from 0.05 to 7% by weight, at least one polypeptide carrying quaternary ammonium groups at the end of the chain or grafted on the chain in proportions of from 0.05 to 7% by weight, and at least one cationic silicone polymer in proportions from 0.05 to 7% by weight of the total weight of the composition, said one cationic silicone polymer being a product of the general formula:



where x' and y' have average values such that the average molecular weight is from 5,000 and 10,000,

(ii) a compound of formula:

$$R'_aG_{3-a}Si{-}OSiG_2)_n(OSiG_bR'_{2-b})_mO\text{-}SiG_{3-a}R'_a$$

in which:

G is H, OH, C_{1-8} alkyl or phenyl,

a is 0, 1, 2 or 3

b is 0 or 1

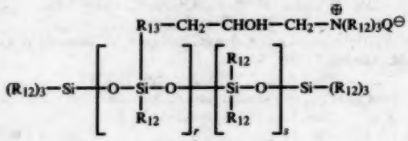
the sum (n+m) is from 1 to 2,000, where n is from 0 to 1,999, and m is from 2,000 to 1,

R' is a monovalent group of formula $C_qH_{2q}L$ in which q is from 2 to 8, and,

L is

$N\ R''—CH_2—CH_2—N(R'')_2$
$N(R'')_2$
$N^{\oplus}(R'')_3A^{\ominus}$
$N^{\oplus}(R'')H_2A^{\ominus}$ or
$NR''CH_2—CH_2—N^{\oplus}R''H_2A^{\ominus}$,
in which R'' is H, phenyl, benzyl, or a saturated monovalent hydrocarbon group of from 1 to 20 carbon atoms, and,
$A^{\ominus}$ is $Cl^{\ominus}$, $Br^{\ominus}$, $I^{\ominus}$ or $F^{\ominus}$,

(iii) a product of general formula:



in which:
R_{12} is a monovalent hydrocarbon group of from 1 to 18 carbon atoms,
R_{13} is a C_1–C_{18} divalent hyrocarbon group,
Q^- is a halide ion,
r is a mean statistical value of from 2 to 20, and s is a mean statistical value of from 20 to 200.

4,673,569

MOUSSE HAIR COMPOSITION

Stephen L. Shernov, Long Valley; Maurice Siegal, Hillsdale, and Richard Markowitz, Montvalle, all of N.J., assignors to Faberge Incorporated, Mahwah, N.J.

Filed Feb. 12, 1985, Ser. No. 700,744
Int. Cl.[4] A61K *7/00, 9/00*
U.S. Cl. 424—47 **6 Claims**

1. A composition for use on human hair adapted to be dispensed as a pressure sensitive foam by use of a propellant, comprising:
a. a water-based phase comprising water, polyvinylpyrrolidone K-30 in an amount between about 1 and 6 weight percent, and sodium benzoate in an amount between about 0.4 and 1.0 weight percent;
b. an alcohol-based phase comprising diethylene glycol dioctanoate/diisononanoate in an amount between about 0.05 and 4.0 weight percent, ethyl alcohol SD40 in an amount between about 2 and 15 weight percent, polyoxethylene 10-oleyl ether in an amount between about 0.6 and 2.5 weight percent and butyl ester polycarboxylic/vinyl methyl ether/maleic anhydride in an amount about between 0.05 and 4.0 weight percent; and
c. ammoniun hydroxide in an amount between about 0.02 and 0.2 weight percent; the weight percents based on the total weight of the composition.

4,673,570

GELLED ANTIPERSPIRANT COMPOSITIONS

Gianluigi Soldati, Mercerville, N.J., assignor to Carter-Wallace, Inc., New York, N.Y.

Filed Mar. 20, 1985, Ser. No. 713,933
Int. Cl.[4] A61K *7/34, 7/38*
U.S. Cl. 424—66 **2 Claims**

1. A clear gelled antiperspirant composition free of waxes and gelling agents containing:
(a) from about 10% to about 25% by weight of a cyclomethicone-dimethicone copolysilicone fluid having a viscosity of 25 C. of 600–2000 cps;
(b) from about 10% to about 30% by weight of a volatile polydimethylcyclosiloxane exemplified by the formula $[CCH_3)_2SiO]_x$ wherein x is an integer of from 4 to 6;
(c) from about 1% to about 10% by weight of a non-volatile emollient material selected from the group consisting of fatty acid esters, fatty acid ethers, linear silicone fluids, polyalkylene glycols, lanolin, lanolin alcohol, mineral oil and mixtures thereof;
(d) from about 2% to about 10% by weight of a coupling agent selected from the group consisting of low molecular weight alcohols and glycols;
(e) from about 15% to about 25% by weight of an active antiperspirant material selected from the group consisting of aluminum chlorohydrates, aluminum zirconium chlorohydrates and complexes thereof.

4,673,571

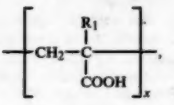
COSMETIC COMPOSITIONS FOR HAIR AND SKIN WHICH CONTAIN A METHACRYLIC OR ACRYLIC ACID COPOLYMER, AN ALKYL ACRYLATE AND/OR METHACRYLATE AND AN ALLYL DERIVATIVE

Claude Mahieu, Paris, and Christos Papantoniou, Montmorency, both of France, assignors to Societe Anonyme dite: L'Oreal, France

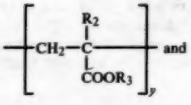
Filed Jul. 23, 1984, Ser. No. 633,421
Claims priority, application France, Jul. 25, 1983, 83 12257
Int. Cl.[4] A61K *7/021, 7/06, 7/11, 7/32*
U.S. Cl. 424—70 **12 Claims**

1. A cosmetic composition for hair, comprising an aqueous or hydroalcoholic solution of an alcohol selected from the group consisting of ethanol and isopropanol and from 0.1 to 30 weight percent of a copolymer comprising repetitive units derived from (1a) an acrylic or methacrylic acid, at least one of (1b) a lower alkyl acrylate and methacrylate and (1c) an allyl derivative, said recurring units being represented by the following formulae:

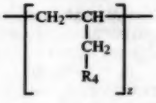
(1a)



(1b)



(1c)



wherein:
R_1 and R_2 are selected from the group consisting of hydrogen and methyl radicals;
R_3 represents a linear or branched chain alkyl radical having from 1 to 10 carbon atoms;
R_4 is selected from the group consisting of —OH, —NH-$CONH_2$ and —$OCOR_5$;
R_5 represents a linear or branched chain alkyl radical having from 1 to 5 carbon atoms; and
x represents 40 to 90 weight percent;
y represents 8 to 50 weight percent;
z represents 1 to 15 weight percent; and
the sum of x+y+z is from 80 to 100 weight percent, said copolymer having a molecular weight of from 5,000 to 200,000 as measured by the light diffusion method.

4,673,572

LIVE PURIFIED MAREK'S DISEASE VACCINE

Gerben F. De Boer, Lelystad, Netherlands, assignor to Centraal Diergeneeskundig Instituut, Netherlands

Filed Apr. 5, 1985, Ser. No. 720,176

Claims priority, application Netherlands, Apr. 9, 1984, 8401120

Int. Cl.[4] A61K *39/12*; C12N *7/08*

U.S. Cl. 424—89 5 Claims

1. A virus preparation comprising a live viral clone of Marek's Disease virus, said clone being of the virus MDV CVI-988 CEF_{65} clone C.

4,673,573

NOVEL FIBRINOLYTIC ENZYME COMPOUNDS

Harry Ferres, Epsom; Richard A. G. Smith, Reigate, and Andrew J. Garman, Betchworth, all of England, assignors to Beecham Group p.l.c., England

Filed Jan. 9, 1985, Ser. No. 689,846

Claims priority, application United Kingdom, Jan. 11, 1984, 8400653

Int. Cl.[4] C12N *9/72, 9/68, 9/48, 9/96*

U.S. Cl. 424—94.63 11 Claims

1. A fibrinolytically active protein conjugate comprising at least one optionally blocked fibrinolytic enzyme linked by way of a site other than the catalytic site responsible for the fibrinolytic activity to at least one intact human protein molecule through a bridging group generated by the reaction of a chemically introduced protein attachment group on one said protein with a chemically introduced linking group on the other said protein.

4,673,574

IMMUNOGENIC CONJUGATES

Porter W. Anderson, 40 Alpine St., Rochester, N.Y. 14620

Continuation-in-part of Ser. No. 298,102, Aug. 31, 1981, abandoned. This application Jul. 5, 1983, Ser. No. 511,048

Int. Cl.[4] A61K *39/02, 39/09, 39/102*; C07K *15/04*

U.S. Cl. 424—92 50 Claims

1. immunogenic conjugate comprising the reductve amination product of an immunogenic capsular polymer fragment having a chain length of from about 10 to about 30 monomeric units and a reducing end, which fragment is derived from the capsular polymer of a *Streptococcus pneumoniae* or *Haemophilus influenzae bacterium*, and a bacterial toxin or toxoid.

4,673,575

COMPOSITION, PHARMACEUTICAL PREPARATION AND METHOD FOR TREATING VIRAL HEPATITUS

Pinayur S. Venkateswaran, Chester; Irving Millman, Willow Grove, and Baruch S. Blumberg, Philadelphia, all of Pa., assignors to Fox Chase Cancer Center, Philadelphia, Pa.

Filed Apr. 26, 1985, Ser. No. 727,452

Int. Cl.[4] A61K *35/78*

U.S. Cl. 424—195.1 11 Claims

1. A composition of matter useful in the treatment of hepatitis B virus infection, which comprises a fraction of *Phyllanthus niruri* L. extract, said fraction containing the methanol extractable components of *Phyllanthus niruri* L., said components having endogenous HBV-DNA polymerase inhibitory activity and HBsAg binding activity.

4,673,576

METHOD OF PRODUCING VEAL AND ANIMAL FEED THEREFOR

Frank J. D'Aiello, Jr., Circleville, Ohio, assignor to The Ohio Grain Company, Milford Center, Ohio

Filed May 7, 1985, Ser. No. 731,409

Int. Cl.[4] A23K *1/00*

U.S. Cl. 426—2 19 Claims

1. A method of producing light-colored veal comprising feeding calves a ration comprising

protein	12–20% by weight
carbohydrate	35–55% by weight
fat	6–12% by weight
available copper	5–20 mg/lb

balance fiber, ash, moisture, minerals and trace elements.

4,673,577

SHELLAC ENCAPSULANT FOR HIGH-POTENCY SWEETENERS IN CHEWING GUM

Mansukh M. Patel, Villa Park, Ill., assignor to Wm. Wrigley Jr. Company, Chicago, Ill.

Continuation of Ser. No. 467,604, Feb. 18, 1983, abandoned. This application Jun. 12, 1985, Ser. No. 745,361

Int. Cl.[4] A23G *3/30*; A23L *1/236*

U.S. Cl. 426—5 5 Claims

1. A chewing gum composition comprising gum base, particles of a high-potency sweetener, and a food grade shellac encapsulant surrounding said particles of the sweetener.

4,673,578

SNACK FOOD PRODUCT WITH HIGH DIETARY FIBER CONTENT AND PROCESS FOR PRODUCING THE SAME

Amy J. Becker, New York; James E. Bagan, Yonkers, both of N.Y., and Mario W. Medri, Short Hills, N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation of Ser. No. 493,451, May 11, 1983, Pat. No. 4,568,557. This application Oct. 31, 1985, Ser. No. 793,369

The portion of the term of this patent subsequent to Feb. 4, 2003, has been disclaimed.

Int. Cl.[4] A23L *1/00*

U.S. Cl. 426—93 21 Claims

1. An uncooked edible snack food product prepared by a process which comprises the steps of:

(A) pre-mixing about 5% to about 30% by weight of an uncooked dietary fiber, based on the total weight of the snack food product, with an oil derived from a food grade product, wherein the dietary fiber absorbs the oil;

(B) pre-mixing about 40% to about 65% by weight of an uncooked compound coating, based on the total weight of the snack food product, with a viscosity modifier selected from the group consisting of lecithin, monoglycerides and diglycerides, said compound coating comprising:

(1) a fat portion in an amount of about 25% to about 55% by weight of the compound coating;

(2) sweetener in an amount of about 30% to about 60% by weight of the compound coating;

(3) milk solids in an amount up to about 30% by weight of the compound coating;

(4) yogurt in an amount up to about 30% by weight of the compound coating; and

(5) at least one flavoring agent in an amount up to about 10% by weight of the compound coating;

(C) blending the pre-mixes of steps (A) and (B) to obtain a homogeneous mixture; and

(D) adding to the mixture of (C) up to about 16% by weight, based on the total weight of the snack food product, of an additive selected from the group consisting of dried fruit, cereal and nuts to obtain the desired texture and flavor; and

(E) extruding the resulting mixture at a temperature between about 100° F. to about 125° F. into the desired shape and allowing to cool.

4,673,579

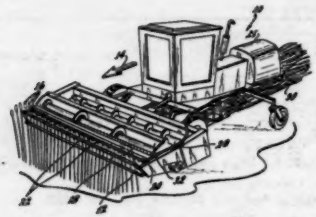
METHOD OF DRYING PLANTS HAVING STEMS AND LEAVES

George S. Fenn, Elkton, Oreg., assignor to Fenn & Company, Cottage Grove, Oreg.

Division of Ser. No. 256,106, Apr. 21, 1981, Pat. No. 4,448,707. This application Feb. 1, 1984, Ser. No. 575,789

Int. Cl.⁴ A23L *3/34*

U.S. Cl. 426—321 **31 Claims**



1. A method of drying plants having stems and leaves, including the following steps:

providing a solution containing a mixture of a drying agent and a mold inhibiting agent with properties to obtain a drying of moisture on the plants and in a concentration dependent upon the amount of moisture to be dried on the plants by the drying agent and the mold inhibiting agent, the drying agent providing a basic pH in the solution and having properties of becoming at least partially insoluble at a pH in the solution no greater than approximately 13.4, the mold inhibiting agent having properties of remaining inactive for different pH conditions in the solution until the occurrence in the plants of particular acidic conditions inducing molding in the plants and having properties of reacting with moisture under such particular acidic conditions in the plants to inhibit the molding of the plants,

bending the plants to provide for a spraying of the solution along the lengths of the stems of the plants and on the leaves of the plants,

spraying the solution along the lengths of the plants and on the leaves of the plants after the bending of the plants, and

cutting the plants after the spraying of the solution along the lengths of the plants and on the leaves of the plants.

4,673,580

PROCESS FOR PRODUCING COFFEE EXTRACT

Osamu Matsuda, and Sadaji Danno, both of Suzuka, Japan, assignors to Ajinomoto General Foods, Inc., Tokyo, Japan

Continuation-in-part of Ser. No. 497,315, May 23, 1983, abandoned. This application Mar. 11, 1985, Ser. No. 710,333

Int. Cl.⁴ A23F *5/26, 5/30*

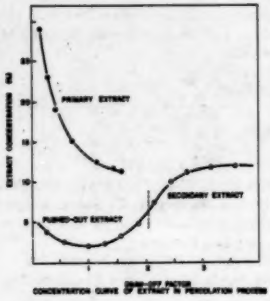
U.S. Cl. 426—385 **6 Claims**

1. In a continuous countercurrent process for producing a high quality coffee extract by split extraction consisting of a primary extraction zone wherein water having a relatively low temperature of about 100° C. to about 145° C. is fed to two or more columns, each loaded with fresh roasted and ground coffee beans to produce a primary extract and a secondary extraction zone wherein water having a relatively high temperature of about 160° C. to about 190° C. is fed to three or more columns that have been subjected to said primary extraction, the improvement which comprises:

(a) removing an initial draw from said secondary extraction zone having a low soluble coffee solids level of about 2% to about 4% by weight and a flavor quality approaching that of the extract produced in the primary extraction, said initial draw consisting of the residual extract from the primary extraction;

(b) removing separately a subsequent draw from said secondary extraction zone having a high soluble coffee solids content of about 5% to about 12% by weight and a lower flavor quality than said initial draw;

(c) concentrating the initial draw of step (a);



(d) combining the concentrated initial draw with the subsequent draw of step (b);

(e) stripping said combination of flavorful coffee aromatics and then further concentrating said combination; and

(f) mixing said concentrated combination with the primary extract and the flavorful coffee aromatics of step (e).

4,673,581

FRIED FOOD PRODUCT FRIED IN SYNTHETIC COOKING OILS CONTAINING DICARBOXYLIC ACID ESTERS

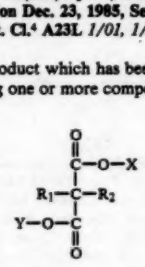
John Fulcher, Dallas, Tex., assignor to Frito-Lay, Inc., Dallas, Tex.

Division of Ser. No. 598,063, Apr. 4, 1984, Pat. No. 4,582,927. This application Dec. 23, 1985, Ser. No. 812,752

Int. Cl.⁴ A23L *1/01, 1/307*

U.S. Cl. 426—531 **7 Claims**

2. A fried food product which has been fried in a synthetic edible oil comprising one or more compounds of the formula



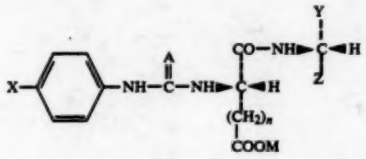
wherein R_1 and R_2, which may be the same or different, are hydrogen or alkyl of from 1 to about 20 carbon atoms, with the proviso that at least one of the R groups, R_1 or R_2, is an alkyl from 1 to 20 carbon atoms, X is an alkyl, alkenyl or dienyl radical of from about 12 to about 18 carbon atoms and Y is an alkenyl or dienyl radical of from about 12 to about 18 carbon atoms.

4,673,582
NOVEL SWEETENING AGENTS, PROCESS FOR SWEETENING VARIOUS PRODUCTS AND COMPOSITIONS CONTAINING SUCH SWEETENING AGENTS

Claude Nofre, Lyons, and Jean M. Tinti, Meyzieu, both of France, assignors to Universite Claude Bernard/Lyon 1, Lyons, France

Filed Mar. 5, 1986, Ser. No. 836,383
Claims priority, application France, Mar. 19, 1985, 85 04241
Int. Cl.[4] A23L *1/26*
U.S. Cl. 426—548 10 Claims

1. Sweetening agents of the general formula:



wherein

x is a CN, $COOC_1$–C_3 alkyl, COC_1–C_3 alkyl, $CONHC_1$–C_3 alkyl, SO_2C_1–C_3 alkyl, SOC_1–C_3 alkyl, SO_2NHC_1–C_3 alkyl, NO_2, F or Cl substituent;

n is 0 or 1;

M is a hydrogen atom or an organic or inorganic physiologically acceptable cation;

Y is a $COOC_1$–C_3 alkyl, C_1–C_3 alkyl, CH_2OH, $CHOHCH_3$ or CF_3 substituent;

Z is a C_1–C_5 n-alkyl, isobutyl, isopentyl, phenyl, cyclohexyl, benzyl, cyclohexylmethyl, $CH_2C_6H_4OH(p)$, CH_2OC_1–C_4 alkyl, CH_2COOC_1–C_4 alkyl, CH_2SC_1–C_4 alkyl, $CH_2CH_2SCH_3$, $CH_2CH_2SO_2CH_3$, $COOC_1$–C_4 alkyl, $COOC_3$–C_7 cycloalkyl, $CONHC_2$–C_4 alkyl, $CONHC_3$–C_7 cycloalkyl, $CONHC_3$–C_7 thiacycloalkyl, or $CONHCH_2COOCH_3$ group; and

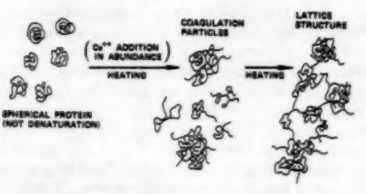
A is an N—CN group.

8. Sweetening compositions containing an adequate quantity of a sweetening agent according to claim 1 with a compatible carrier.

4,673,583
METHOD OF PRODUCING CALCIUM-ENRICHED ASEPTIC SOY BEAN CURD

Tamotsu Kuwata, Tokorozawa; Yutaka Suginaka, Saitama, and Hideo Ohtomo, Higashimurayama, all of Japan, assignors to Meiji Milk Products Co., Ltd., Tokyo, Japan

Filed Feb. 21, 1986, Ser. No. 831,529
Claims priority, application Japan, Feb. 21, 1985, 60-031554; Apr. 3, 1985, 60-069105
Int. Cl.[4] A23J *3/00*; A23L *1/20*
U.S. Cl. 426—573 10 Claims



1. A method of producing calcium-enriched aseptic soy bean curd comprising the steps of

adding calcium saccharate as coagulant in an amount of 30 to 100 mg % as a calcium to soy bean milk to form a mixture;

sterilizing the mixture of the soy bean milk and the calcium saccharate by heating;

adjusting the pH value of the sterilized mixture in the range of 5.7 to 5.9;

charging the sterilized mixture into an open container under an aseptic condition and sealing the opening of the container;

and heating the sterilized mixture in the container for 20 to 60 minutes at a temperature of 75° to 95° C., whereby said mixture is coagulated by said calcium saccharate.

4,673,584
PROCESS FOR PROVIDING ARTICLES WITH A BIOCOMPATIBLE SURFACE LAYER

Bo H. Nygren, Billdal, and Johan E. Stenberg, Gothenburg, both of Sweden, assignors to Astra Meditec AB, Sweden

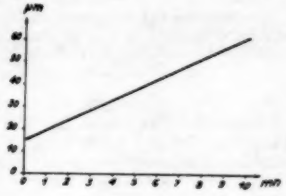
Division of Ser. No. 576,377, Jan. 13, 1984, Pat. No. 4,588,624.
This application Mar. 5, 1986, Ser. No. 836,318
Claims priority, application Sweden, May 14, 1982, 8203029
Int. Cl.[4] A01N *1/02*
U.S. Cl. 427—2 5 Claims

1. A process for providing articles exhibiting at least one surface of glass, silicon, aluminum or silicone rubber with a biocompatible surface layer, wherein said surface of the article, after oxidation thereof when said article is silicone rubber, is reacted with a silane containing at least one epoxy group and wherein the surface thus treated is reacted with a polysaccharide containing at least one hydroxyl group.

4,673,585
PROCESS FOR THE PREPARATION OF THE SURFACE OF URANIUM OR URANIUM-BASED ALLOY PARTS

Michel Anzola, Bretigny; Daniel Lefevre, Longvilliers; Patrick Massicot, Vanves; Jacques Pierre, Montrouge, and Antoine Henry, Ivry-sur-Seine, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Jul. 8, 1985, Ser. No. 752,595
Claims priority, application France, Jul. 18, 1984, 84 11387
Int. Cl.[4] C23F *1/30*
U.S. Cl. 427—6 15 Claims



1. A process for the preparation of the surface of a uranium-vanadium part, comprising chemically etching the surface of the said uranium-vanadium part by means of a solution of nickel chloride and hydrochloric acid.

4,673,586
METHOD FOR MAKING PLASTIC CONTAINERS HAVING DECREASED GAS PERMEABILITY

Gerald W. White, Dallas, Tex., assignor to Cosden Technology, Inc., Dallas, Tex.

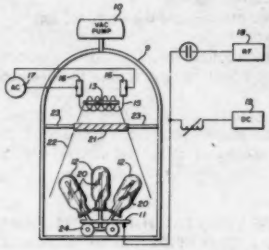
Filed Oct. 29, 1985, Ser. No. 792,395
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—38 4 Claims

1. A method of making plastic containers having decreased gas permeability comprising the steps of:

ionizing a material to be deposited on the plastic container:

locating a magnetic field in said container whereby the

residency of said thermionic electrons about said containers is prolonged; and,



positioning a screen between the containers and the material being ionized for preventing damage to said containers by heat generated by ionization.

4,673,587

METHOD OF PRODUCING A COMPOSITE CERAMIC BODY

Osami Kamigaito; Shoji Noda, and Haruo Doi, all of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Filed Mar. 27, 1986, Ser. No. 844,972

Claims priority, application Japan, Apr. 26, 1985, 60-91534

Int. Cl.[4] B05D *3/06*; **C23C** *14/00*

U.S. Cl. 427—38 **3 Claims**

1. A method of producing a composite ceramic body, comprising:

forming an amorphous ceramic film selected from the group consisting of silicon nitride (Si_3N_4), aluminum oxide (Al_2O_3), silicon oxide (SiO_2) and mullite on the surface of a ceramic substrate selected from the group consisting of silicon nitride (Si_3N_4), silicon carbide (SiC), aluminum oxide (Al_2O_3) and zirconium oxide (ZrO_2), said film having a thickness of 0.1 to 10 microns; and

irradiating said film with ions selected from the group consisting of helium, nitrogen, neon, argon and xenon, said ions having high energy ranging from 60 KeV to 3 MeV which causes atom mixing between said substrate and said film thereby resulting in firm and integral adherence of said film to said ceramic substrate.

4,673,588

DEVICE FOR COATING A SUBSTRATE BY MEANS OF PLASMA-CVD OR CATHODE SPUTTERING

Udo Bringmann; Klaus Drews, and Detlef G. Schön, all of Halstenbek, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 25, 1985, Ser. No. 694,725

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1984, 3402971

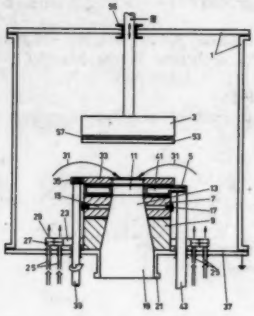
Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—41 **3 Claims**

1. A method of forming a polymeric coating on a substrate by means of a plasma chemical vapor deposition, said method comprising:

(a) positioning a substrate on a surface of a first annular electrode provided with an aperture extending along its central axis and axially fixed in a evacuatable chamber provided with a second counter sheet electrode spaced from and opposing said first electrode, and further provided with a bipartite insulator block having an upper first portion adjoining said first electrode and provided with a central aperture corresponding to the central aperture of said first electrode and having a second portion immediately adjoining said first portion bearing on the base of said evacuatable chamber and positioned over a conduit means for conducting gaseous material from said chamber to a vacuum pump means;

(b) evacuating gaseous material from said evacuatable chamber by means of said vacuum pump means while providing a flow of a plasma polymerizable monomeric gas into said



chamber and into said aperture provided in said first annular electrode and;

(c) forming a glow discharge on said substrate while rotating said substrate thereby causing said polymerizable gas to be polymerized and form an essentially uniform coating on said substrate.

4,673,589

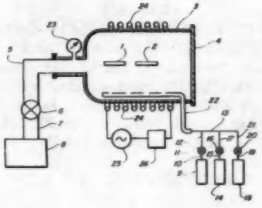
PHOTOCONDUCTING AMORPHOUS CARBON

Robert W. Standley, Naperville, Ill., assignor to Amoco Corporation, Chicago, Ill.

Filed Feb. 18, 1986, Ser. No. 830,701

Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—41 **19 Claims**



1. A sulfur- and hydrogen-doped amorphous carbon which is prepared by the process which comprises depositing said doped amorphous carbon from a plasma glow discharge in a gas mixture which comprises at least one hydrocarbon and at least one sulfur source, wherein said gas mixture is at a pressure in the range from about 0.001 to about 1 torr, the composition of said gas mixture is adjusted to yield a doped amorphous carbon which has an atom ratio of hydrogen to carbon which is in the range from about 0.1 to about 2.0 and an atom ratio of sulfur to carbon which is in the range from bout 0.005 to about 0.20, said hydrocarbon is selected from the group consisting of volatile hydrocarbons, and said sulfur source is selected from the group consisting of volatile organic and inorganic compounds which contain sulfur.

4,673,590

PROCESS FOR PREPARING A MAGNETIC RECORDING MEDIUM

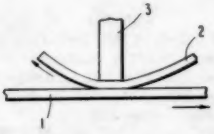
Hiroshi Hashimoto; Tsutomu Okita, and Noburo Hibino, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 690,903, Jan. 14, 1985, abandoned. This application Feb. 25, 1986, Ser. No. 833,680

Claims priority, application Japan, Jan. 13, 1984, 59-3584; Jan. 18, 1984, 59-5674

Int. Cl.[4] H01F *10/02*

U.S. Cl. 427—44 6 Claims



1. A process for preparing a magnetic recording medium having a non-magnetic support having a surface roughness of not less than 0.01 μm and which is not accompanied by dropout due to protrusions having a height of about 0.2 μm or more which comprises (1) subjecting a surface of a non-magnetic support having a surface roughness of not less than 0.01 μm to an abrasion treatment or a calendering treatment to remove said protrusions having a height of about 0.2 μm or more but retaining the surface roughness of not less than 0.01 μm, (2) coating a layer containing a compound polymerizable by radiation exposure on the surface of said non-magnetic support, (3) exposing the layer to radiation to polymerize and harden the same, and (4) providing a magnetic layer on the radiation exposed layer

wherein said radiation exposed layer has a surface roughness of less than 0.01 μm and

wherein said calendering treatment is carried out at a temperature of 40° to 200° C.

4,673,591

PRODUCTION OF LAYER-TYPE MAGNETIC RECORDING MEDIA

August Lehner, Roedersheim-Gronau; Guenter Heil, Ludwigshafen; Werner Lenz, Bad Durkheim; Werner Balz, Limburgerhof; Albert Kohl, Laumersheim, and Gunnar Schornick, Neuleiningen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jul. 26, 1985, Ser. No. 759,237

Claims priority, application Fed. Rep. of Germany, Jul. 27, 1984, 3427681.5

Int. Cl.[4] H01F *10/02*

U.S. Cl. 427—48 10 Claims

1. A process for the production of a layer-type magnetic recording medium by dispersing a finely divided magnetically anisotropic material in a binder which consists of not less than 30% of a radiation-curable aqueous binder dispersion, applying the dispersion onto a non-magnetic base, orienting the magnetically anisotropic material and drying and crosslinking the applied layer, wherein the radiation-curable aqueous binder dispersion essentially consists of

(A) from 20 to 80% by weight of water,

(B) from 80 to 20% by weight of one or more prepolymers which are dispersed in (A), contain from 0.01 to 1.0 mole of polymerizable C—C double bonds per 100 g of prepolymer and have a mean molecular weight of not less than 350 and a viscosity of not less than 600 cP at 23° C., with the proviso that the sum of the percentages stated under (A) and (B) is 100, and in addition

(C) from 0.1 to 30% by weight, based on (B), of one or more dispersants,

the crosslinked unpigmented polymer film having an elongation greater than 10%, a tensile strength greater than 10 N/mm^2 and a modulus of elasticity greater than 100 N/mm^2.

4,673,592

METAL PLANARIZATION PROCESS

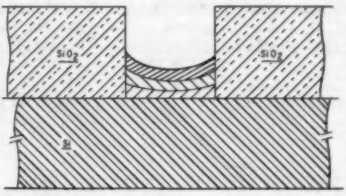
Vernon R. Porter, Plano, and Samuel C. Baber, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 2, 1982, Ser. No. 384,353

The portion of the term of this patent subsequent to May 15, 2001, has been disclaimed.

Int. Cl.[4] H01L *21/268*

U.S. Cl. 427—53.1 14 Claims



1. A process for filling recesses in a low-thermal-conductivity material, comprising the steps of:

providing a high-thermal-conductivity first layer;

depositing a low-thermal-conductivity additional layer above said first layer;

etching a contact hole through a selected portion of said low-thermal-conductivity layer to expose said first layer;

depositing a high-thermal-conductivity top layer overall;

irradiating said top layer at a power density greater that 1 kW per square centimeter and an energy density of greater than 0.05 Joules per square centimeter, whereby said top layer loses its adhesion to said low-thermal-conductivity layer;

mechanically removing remaining portions of said top layer from above said low-thermal-conductivity layer; and

repeating said deposition, irradiation, and removal steps until said selected portion of said additional layer has been filled to at least the approximate height of said additional layer.

4,673,593

PROCESS FOR FORMING AN OHMIC ELECTRODE ON A P-TYPE III-V COMPOUND SEMICONDUCTOR

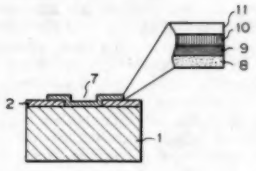
Takeshi Himoto, Osaka, Japan, assignor to Sumitomo Electric Industries Ltd., Osaka, Japan

Filed Mar. 4, 1985, Ser. No. 708,052

Claims priority, application Japan, Mar. 7, 1984, 59-43634

Int. Cl.[4] H01L *21/285*

U.S. Cl. 427—89 2 Claims



1. A process for producing a semiconductor device comprising the following steps:

forming on surface of a p-type III–V compound semiconductor in sequence a first ti layer having a thickness of less

than 100 Å, a second Zn layer, a third metal layer made of one element selected from the group consisting of Pt, Mo, W and Cr, and a fourth Au layer;

heat-treating the assembly either in a gaseous atmosphere made of H_2, N_2, Ar or a mixture thereof or in a vacuum so that Zn in the second layer penetrates through the first Ti layer to reach the surface of the semiconductor, thereby forming a layer of an alloy of said semiconductor with Zn.

4,673,594

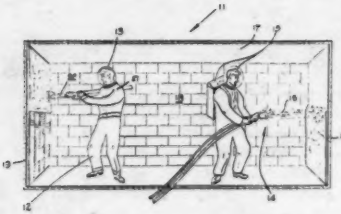
METHOD FOR APPLYING A LAYER OF FIBER ON A SURFACE AND A REFRACTORY MATERIAL PRODUCED THEREBY

William H. Smith, McMurray, Pa., assignor to Manville Service Corporation, Denver, Colo.

Continuation of Ser. No. 660,206, Oct. 12, 1984, Pat. No. 4,547,403, which is a continuation-in-part of Ser. No. 542,272, Oct. 17, 1983, abandoned. This application Oct. 11, 1985, Ser. No. 786,923

Int. Cl.[4] B05D 1/02, 1/34, 1/36

U.S. Cl. 427—196 12 Claims



1. A method for forming a layer of refractory fibers on a surface comprising the steps of:

spraying a stream of said fibers toward a surface;

coating said sprayed fibers with an aluminum phosphate liquid binder during said step of spraying; and

curing said coated fibers on said surface.

4,673,595

MICROENCAPSULATION BY PHASE SEPARATION OF WATER-SOLUBLE MEDICAMENTS

Piero Orsolini, Martigny; Rolland-Yves Mauvernay, and Romano Deghenghi, both of Lausanne, all of Switzerland, assignors to Debiopharm, S.A., Switzerland

Filed Oct. 15, 1985, Ser. No. 787,249

Claims priority, application Switzerland, Oct. 17, 1984, 4979/84

Int. Cl.[4] A61K 9/36, 9/52; B01J 13/02

U.S. Cl. 427—213.32 10 Claims

1. A method of microencapsulation comprising

(a) dissolving a biocompatible first polymer in a first organic solvent immiscible in water,

(b) dispersing an aqueous solution of a predetermined medicamentous substance in said first organic solvent,

(c) introducing a second polymer not compatible with said first polymer into said dispersion at ambient temperature under stirring whereby embrionic microcapsules are caused to form by deposition of said first polymer upon the said dispersed medicamentous substances.

(d) pouring the mixture obtained in step (c) above into an excess of a second organic solvent not miscible with water and being a non-solvent for said deposited first polymer whereby said microcapsules are hardened by the extraction of said first solvent from the mass of said first polymer deposited upon said medicamentous substance,

(e) permitting said microcapsules to settle, removing said capsules from said supernatant liquid and drying said capsules,

characterized therein that the non-solvent utilized in hardening step (d) is a fluorinated or fluorohalogenated aliphatic hydrocarbon, or a mixture of fluorinated or fluorohalogenated hydrocarbons and said fluorinated or fluorohalogenated hydrocarbon or mixture of fluorinated or fluorohalogenated hydrocarbons is used in excess with respect to the sum of the volumes of solvent and non-compatible polymer resulting from phase separation step (c), and said hardening step is carried out at a temperature of from about 0° C. to about 25° C.

4,673,596

PROCESS FOR PRODUCING DECORATIVE SHEET

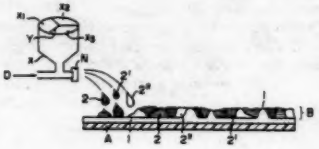
Toru Shoji, Misato; Mitsuru Sugiyama, Noda; Makoto Takezawa, Nagareyama; Yuichi Akiba, Tokyo; Akira Kaneko, Yono, and Mitsuo Sato, Tokyo, all of Japan, assignors to Lonseal Corporation, Tokyo, Japan

Continuation of Ser. No. 621,662, Jun. 18, 1984, abandoned. This application Sep. 13, 1985, Ser. No. 775,953

Claims priority, application Japan, Jun. 24, 1983, 58-114791

Int. Cl.[4] B05D 3/02, 5/06

U.S. Cl. 427—262 20 Claims



1. A process for producing a decorative sheet, comprising the steps of:

(a) applying a paste comprising a synthetic resin onto the upper surface of a substrate sheet to form an undercoat layer;

(b) laterally spraying, by means of a spraying system, one or more pastes, each paste comprising colored synthetic resin of the same material and having approximately the same viscosity as the paste comprising the undercoat layer, onto the undercoat layer so as to cause each of the one or more pastes to be dropped onto the undercoat layer, whereby a smoothing phenomenon occurs wherein the one or more pastes forming a pattern layer cooperate with the undercoat layer to form a smooth patterned surface; and

(c) heating and gelling the pattern layer.

4,673,597

SLIDING WAX

Shoji Hashimoto, Kosaka, Japan, assignor to Dowa Mining Co., Ltd., Tokyo, Japan

Division of Ser. No. 694,244, Jan. 24, 1985, abandoned. This application Apr. 25, 1986, Ser. No. 858,898

Int. Cl.[4] B05D 3/02

U.S. Cl. 427—374.4 12 Claims

1. A method of providing a sliding surface on ski's comprising:

(a) softening by warming a solid material from the group consisting of gallium and molybdenum disulfide,

(b) applying a thin layer of said softened material to said sliding surface; and,

(c) subjecting said material to ambient temperature.

4,673,598

TWO STAGE FLAMEPROOFING OF CELLULOSIC FABRIC

Shimpei Itoh, Toyonaka, and Tadao Sasakura, Itami, both of Japan, assignors to Nitto Boseki Co., Ltd., Fukushima, Japan

Filed May 14, 1986, Ser. No. 863,173
Claims priority, application Japan, May 15, 1985, 60-103387
Int. Cl.[4] B05D 3/02
U.S. Cl. 427—412 7 Claims

1. A flameproofing process which comprises treating a woven or knitted fabric comprising a cellulosic fiber with a boron hydride compound and/or a metal borohydride compound, followed by treating it with an amidophosphazene compound.

4,673,599

SYNTHETIC FUR GARLAND AND METHOD OF MAKING SAME

David Vanderslice, 40 Oak Forest Dr., Sicklerville, N.J. 08081

Filed Jan. 24, 1986, Ser. No. 822,283
Int. Cl.[4] A41G 1/04
U.S. Cl. 428—10 23 Claims

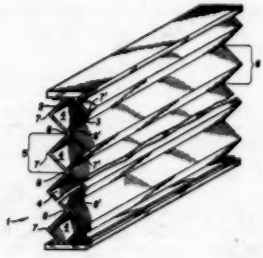
1. A method of making an synthetic fur garland comprising:
(a) providing a synthetic plush pile knitted fabric comprising a knitted body mesh with a face of plush pile fibers interlocked into the body mesh wherein the knit allows the fabric to be pulled crosswise and not lengthwise,
(b) cutting a strip of fabric crosswise across the width of the fabric,
(c) pulling the fabric strip along its length causing the strip to curl into a tubular shape with the fur on the outside, and
(d) fixing attachment means to each end of the curled strip for attaching, detaching, and reattaching the ends to other lengths of garland forming a continuous length of garland.

4,673,600

HONEYCOMB STRUCTURE

Richard N. Anderson, Owensboro, Ky., assignor to Hunter Douglas Inc., Totowa, N.J.

Division of Ser. No. 796,035, Nov. 7, 1985, Pat. No. 4,622,255.
This application Jan. 15, 1986, Ser. No. 819,098
Int. Cl.[4] B32B 3/12
U.S. Cl. 428—12 6 Claims



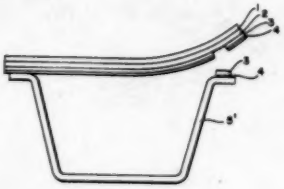
1. In a honeycomb structure constructed of foldable material and defining a plurality of longitudinally extending cells connected together in overlying expandable-collapsible relationship for collapsing each cell against the overlying cell, each cell having a longitudinally extending front face and a longitudinally extending back face, the improvement wherein:
(a) the cells are joined together by direct attachment of the material of each cell in overlapped relation to the material of the next adjacent cell; and
(b) the total thickness of the cell material in the area of attachment when the cells are in collapsed relationship is greater than twice the single thickness of the cell material in the remaining part of the cell.

4,673,601

COLD- OR HEAT-SEALABLE COMPOSITE FILM FOR RECLOSABLE PACKAGES

Alfons Lamping, Corminboeuf; Beat Karth, Oberönz, and Werner Hiltbrunner, Bern, all of Switzerland, assignors to Nyffeler, Corti AG, Switzerland

Filed May 6, 1985, Ser. No. 730,942
Claims priority, application Fed. Rep. of Germany, May 7, 1984, 3416755
Int. Cl.[4] B32N 5/02
U.S. Cl. 428—35 12 Claims



1. A cold- or heat-sealable composite film for sealing and resealing reclosable packages or containers which comprises:
a carrier film, a permanently adhesive layer and a covering layer, said permanently adhesive layer being disposed between said carrier film and said covering layer, said covering layer being made of a material having an elongation at break and a tearing strength which is lower than the cohesive strength between the composite film and the sealing bond with the package or container.

4,673,602

COMPOSITE SUBSTRATE PLATE FOR MAGNETIC OR OPTICAL DISK AND PROCESS FOR PRODUCTION THEREOF

Syoichi Nakayama, Yokohama; Keita Inui, Tsu, and Setsuo Suzuki, Yokohama, all of Japan, assignors to Sumitomo Bakelite Company Limited, Tokyo, Japan

Filed Jun. 5, 1985, Ser. No. 741,489
Claims priority, application Japan, Jun. 13, 1984, 59-119939; Jun. 13, 1984, 59-119940; Jul. 31, 1984, 59-159153; Oct. 12, 1984, 59-212659; Oct. 15, 1984, 59-214237; Oct. 18, 1984, 59-217353; Nov. 30, 1984, 59-251675; Nov. 30, 1984, 59-251677
Int. Cl.[4] G11B 23/42, 7/24
U.S. Cl. 428—65 8 Claims

1. A magnetic or optical recording disc composite substrate plate comprising a metal plate, an undercoat resin layer formed on one side or both sides of said metal plate, and a surface resin layer having a microscopically smooth surface formed on said

undercoat resin layer, said undercoat resin layer having a thickness of 5–200 microns and comprising a cured resin which is more flexible than said surface resin layer, and said surface resin layer having a thickness of 5–500 microns.

8. A magnetic or optical recording disc having a composite substrate plate, said substrate comprising a metal plate, an undercoat resin layer formed on one side or both sides of said metal plate, and a surface resin layer having a microscopically smooth surface formed on said undercoat resin layer, said undercoat resin layer having a thickness of 5–200 microns and comprising a cured resin which is more flexible than said surface resin layer, and said surface resin layer having a thickness of 5–500 microns.

4,673,603

FLOOR MAT MOUNTING SYSTEM

David W. Roth, Grosse Pte. Park, Mich., assignor to The 2500 Corporation, Birmingham, Mich.

Continuation of Ser. No. 444,986, Nov. 29, 1982, Pat. No. 4,481,240, Continuation-in-part of Ser. No. 131,262, Mar. 17, 1980, Pat. No. 4,361,610. This application Nov. 5, 1984, Ser. No. 669,255

The portion of the term of this patent subsequent to Nov. 30, 1999, has been disclaimed.

Int. Cl.[4] B32B *3/06;* **B60J** *9/00*

U.S. Cl. 428—85 **11 Claims**

1. A flexible non-skid carpet protector adapted to be used on vehicle carpets, including, in combination, a carpet backing of a desired shape and cross section, a separate layer of a covering material of a complimentary shape attached to the top of said carpet backing, and a plurality of separate retaining devices, distinct from said carpet backing, and affixed about the perimeter of the underside of said carpet backing, said retaining devices having thereon a plurality of stiff bristles having a spacing sufficient therebetween to allow the insertion of a floor carpet material in a frictional mesh-type arrangement wherein said stiff bristles are of a length no more than three-fourths of the average length of carpet material on which said non-skid carpet protector is intended to be used.

4,673,604

EXTRUSION COATED CARPET BACKING AND METHOD OF MANUFACTURE

William J. Frain, III, Atlanta, Ga.; Donald R. Hazelton, Chatham, N.J., and Edgar W. Young, Summerville, S.C., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Sep. 27, 1984, Ser. No. 654,906

Int. Cl.[4] B32B *3/02*

U.S. Cl. 428—95 **16 Claims**

1. A carpet construction comprising (a) a polyolefin primary carpet backing fabric having a thin elastomer containing film coextruded to at least one side thereof, and (b) face yarns stitched into said primary carpet backing fabric wherein said elastomer containing film comprises an elastomer and a polyolefin.

4,673,605

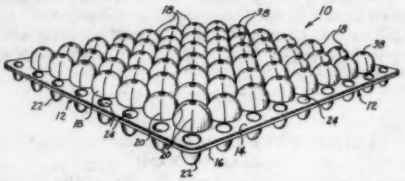
BODY SUPPORT PAD

Ralph M. Sias; Nancy J. Hurley, both of North Hollywood, Calif., and Melvin W. Dalebout, Salt Lake City, Utah, assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation of Ser. No. 737,373, May 23, 1985, Pat. No. 4,605,582. This application Jul. 25, 1986, Ser. No. 890,429

Int. Cl.[4] A61G *7/02;* **A47C** *27/22*

U.S. Cl. 428—120 **28 Claims**



1. A body supporting pad comprising:

a generally flexible base member having an upper surface and a lower suface;

a plurality of pillar means extending outwardly from the lower surface and arranged in discrete arrays of pillar means of substantially similar character for substantially evenly contacting any supportive surface upon which the pad is placed while a body is supported on the pad and for providing different resistive forces in each of such discrete arrays of pillar means; and

a plurality of pod means extending outwardly from the upper surface and axially offset from the pillar means, for providing resistive forces to the body generally normal to the body.

21. A body support pad comprising:

a generally flexible base member having an upper surface and a lower surface;

a plurality of pod means extending outwardly from the upper surface and arranged in discrete arrays wherein each array of pod means provides different resistive forces generally normal to the body supported on the pad, and

a plurality of pillar means extending outwardly from the lower surface for substantially evenly contacting any supportive surface upon which the pad is placed while a body is supported on the pad.

4,673,606

LOAD-INTRODUCING ARMATURE AS COMPONENT PART OF A LAMINATED STRUCTURAL ELEMENT

Harald Undén, Essingekroken 6-8, S-112 65, Stockholm, and Sven-Olof Ridder, Tyköviigen 4B, 181 61, Lidingö, both of Sweden

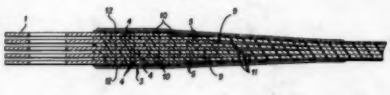
PCT No. PCT/SE85/00074, § 371 Date Oct. 2, 1985, § 102(e) Date Oct. 2, 1985, PCT Pub. No. WO85/03683, PCT Pub. Date Aug. 29, 1985

PCT Filed Feb. 13, 1985, Ser. No. 786,961

Claims priority, application Sweden, Feb. 14, 1984, 8400791

Int. Cl.[4] B32B *3/10;* **B64C** *1/00*

U.S. Cl. 428—138 **9 Claims**



1. A laminated structural element (3) composed of layers of fibre-reinforced plastic matrix and at least one load-introducing armature (1) at least partly embedded between the layers, each armature having at least one coupling hole each, characterized in that the portion of the armature embedded between

said plastic matrix layers is provided with through-holes distributed over the surface of the armature, said through holes having larger opening width than depth and that pegs compatible with the matrix material connect the embedding plastic matrix layers through the holes in each armature (1) for the introduction of load via the armature to the structural element with both ends of each peg subject to shearing stress.

4,673,607

INSULATING POLYOLEFIN LAMINATE PAPER AND METHOD FOR PRODUCING SAME, AND ELECTRIC POWER SUPPLY CABLE

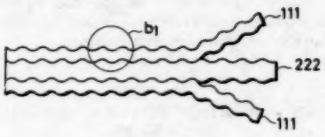
Ryosuke Hata; Shosuke Yamanouchi; Masayuki Hirose, all of Osaka; Hidemitsu Kuwabara, Shizuoka; Yasuharu Mizumoto, Shizuoka, and Yasuhiro Hagiuda, Shizuoka, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Sep. 10, 1984, Ser. No. 649,004

Claims priority, application Japan, Sep. 9, 1983, 58-167082

Int. Cl.[4] B32B *3/00, 23/08;* D03D *3/00*

U.S. Cl. 428—172 1 Claim



1. An insulating polyolefin laminate paper comprising: first and second fiber paper layers having an impermeability of 20 to 4000 Gurley-seconds and a polyolefin film layer to which said first and second fiber paper layers are laminated, at least one of said fiber paper layers being mechanically deformed prior to lamination in such a manner that irregularities whose depth is 2 to 50% of the thickness of said fiber paper layer are formed thereon, and a water content of said fiber paper layers being controlled to 4% immediately before laminating to said polyolefin film layer, said fiber paper layers having a thickness of at least 30 microns.

4,673,608

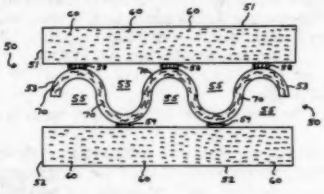
BOOK PANEL CONSTRUCTION

Thomas L. Cline, Hanover, Pa., assignor to Corra-Board Products Co., Hanover, Pa.

Filed Aug. 18, 1986, Ser. No. 897,255

Int. Cl.[4] B32B *3/12*

U.S. Cl. 428—182 4 Claims



1. In combination with hardcover book structure (10) having a solid front panel (20), a solid rear panel (21) and a flexible middle binding section (25),

a book panel structure (50) having an overlayer (5) comprised of chipboard material having relatively shorter fiber lengths (60) contained therein,

said book panel structure having an underlayer (52) comprised of chipboard material having relatively shorter fiber lengths (60) contained therein,

said book panel structure further having an undulating midstratum layer (53) between said overlayer (51) and underlayer (52),

wherein the upper undulation portions of said midstratum layer (53) are secured to said overlayer (51) by adhesive means (58),

and wherein the lower undulation portions of said midstratum layer (53) are secured to said underlayer (52) by adhesive means (59),

said book panel structure providing means wherein air cells (55) are formed internally thereof such that a given book panel caliper or thickness may be maintained while reducing the number of chipboard layers required for construction,

wherein said undulating midstratum layer (53) has relatively longer fiber lengths (70) contained therein as compared to the relatively shorter fiber lengths (60) contained in said overlayer (51) and said underlayer (52).

4,673,609

UNIDIRECTIONAL PANEL

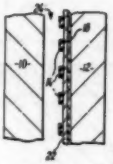
George R. Hill, 14 Pownall Ave., Bramhall, Stockport, Cheshire, England

Filed Jul. 29, 1985, Ser. No. 760,048

Claims priority, application United Kingdom, Jul. 28, 1984, 8419312; Feb. 19, 1985, 8504187

Int. Cl.[4] B05D *1/12;* E04B *1/00;* E06B *7/12;* G02B *17/00*

U.S. Cl. 428—187 28 Claims



19. A glazing assembly comprising:

a first panel of light permeable material;

a second panel of light permeable material;

at least one design formed on said first panel, said design visible from one side of said first panel and not visible from the other side of said first panel, said design being superimposed on or forming a part of a silhouette pattern and wherein said design is decreasingly perceptible from the one side of the first panel as the level of illumination through the panel from the other side of the first panel increases; and

at least one second design formed on said second panel, said second design visible from one side of said second panel and not visible from the other side of said second panel, said second design being superimposed on or forming a part of said silhouette pattern and wherein said second design is decreasingly perceptible from the one side of the second panel as the level of illumination through the panel from the other side of the second panel increases.

4,673,610

MAGNETIC RECORDING MEDIUM HAVING IRON NITRIDE RECORDING LAYER

Ryuji Shirahata; Yoshihiro Arai, and Tadashi Yasunaga, all of Kanagawa, Japan, assignors to Fuji Photo Film Company, Limited, Japan

Filed Aug. 20, 1985, Ser. No. 767,778

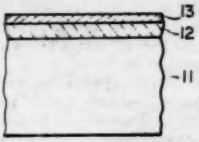
Claims priority, application Japan, Aug. 24, 1984, 59-176163

Int. Cl.[4] G11B *5/66*

U.S. Cl. 428—213 7 Claims

1. A magnetic recording medium comprising a non-magnetic substrate, a first magnetic film layer which is formed on the non-magnetic substrate and whose major component is cobalt,

and a second magnetic film layer which is overlayed on the first magnetic film layer and whose major component is iron

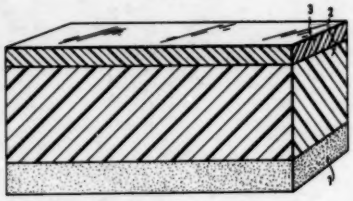


nitride, said first and second magnetic layers being non-binder type magnetic recording films.

4,673,611
SUPPORT FILM AND PRESSURE-SENSITIVE ADHESIVE TAPE

Guenther Crass, Taunusstein; Annegrete Bursch, Rüdesheim, and Peter Hammerschmidt, Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jun. 12, 1985, Ser. No. 743,773
Claims priority, application Fed. Rep. of Germany, Jun. 15, 1984, 3422302
Int. Cl.[4] B32B 7/02; C09J 7/02
U.S. Cl. 428—215 **16 Claims**



1. Pressure-sensitive adhesive tape, comprising:
a support film including a co-extruded, biaxially-oriented, multilayer, polypropylene film having at least first and second layers of different composition, wherein the second layer incorporates a polydiorganosiloxane anti-adhesive substance, and wherein the second layer has a thickness less than one third of the thickness of the adhesive tape; and
an adhesive coating applied to the first layer, wherein the second layer faces away from the adhesive coating and defines an outer surface.

4,673,612
MAGNETIC RECORDING MEDIUM

Hiroshi Takagi; Akira Shinmi, and Kenji Suzuki, all of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 27, 1985, Ser. No. 813,853
Claims priority, application Japan, Dec. 28, 1984, 59-276496
Int. Cl.[4] G11B 5/704
U.S. Cl. 428—216 **15 Claims**

1. A magnetic recording medium comprising an aromatic polyimide film and a magnetic layer of a ferromagnetic metal provided on said aromatic polyamide film; said aromatic polyimide film being prepared by imidation of a film formed from a solution of an aromatic polyamic acid which has been obtained by copolymerization of aromatic diamine components comprising 40–95 mole % of a p-phenylenediamine and 5–60 mole % of diaminodiphenyl ether, respectively based on the total amount of the aromatic diamine components, and tetracarboxylic acid components comprising 15–85 mole % of biphenyltetracarboxylic acid dianhydride and 15–85 mole % of pyromellitic acid dianhydride.

4,673,613
LAMINATE MATERIAL COMPRISING POLYURETHANE AND METAL MESH

Noel D. Ward, Buff Point, Australia, assignor to Vickers Xatal Pty. Ltd., New South Wales, Australia

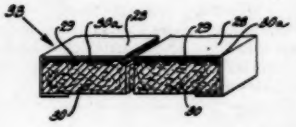
Filed Oct. 22, 1985, Ser. No. 790,230
Claims priority, application Australia, Mar. 21, 1985, PG9845/85
Int. Cl.[4] B32B 3/10, 15/02, 27/40
U.S. Cl. 428—247 **12 Claims**

1. A laminate article having increased resistance to puncture or slashing which comprises
(a) a moulded substantially non-cellular support member formed from a thermosetting polymeric composition including an effective amount of
(i) a polyurethane resin,
(ii) a plasticiser for the polyurethane resin, and
(iii) a polyurethane curing agent,
(b) a reinforcing wire mesh member fully embedded within the moulded support member (a) and having a width less than the moulded support member.

4,673,614
ROOF INSULATION BOARD AND METHOD OF MAKING

James R. Wells, Heath; Donald C. Portfolio, Newark, and Richard B. Beck, Granville, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Oct. 3, 1986, Ser. No. 915,168
Int. Cl.[4] B32B 7/12, 11/04, 11/06
U.S. Cl. 428—285 **4 Claims**



1. A roof insulation board comprising a glass fiber board and a facing adhered to one of two major faces thereof by foamed asphalt adhesive.

4,673,615
STIFF FRAY RESISTANT MAT MATERIAL

Richard Murphy, and John Capron, both of Haverhill, Mass., assignors to Foss Manufacturing Co., Inc., Haverhill, Mass.

Filed Jan. 8, 1986, Ser. No. 817,128
Int. Cl.[4] B32B 27/08, 27/12, 31/06, 31/20
U.S. Cl. 428—286 **8 Claims**

1. A stiff abrasion resistant laminated mat material comprising:
an extruded sheet of a stiff water resistant thermoplastic polymer material selected from the group consisting of ethlene, propylene, vinyl, polyester, and polyamide based polymers and copolymers, the extruded sheet having a thickness of less than about 100 mils;
a first layer of a needled non-woven thermoplastic fabric material laminated to one side of the sheet during extrusion of the sheet; and,
a second layer of a needled non-woven thermoplastic fabric material laminated to the other side of the sheet during extrusion of the sheet;
the first and second layers being bonded to the sheet solely through interlocking of fiber portions of the fabric materials with the matrix of the sheet.

4,673,616

MOLDABLE LATEX IMPREGNATED TEXTILE MATERIAL

Robert F. Goodwin, Haverhill, Mass., assignor to Foss Manufacturing Co., Inc., Haverhill, Mass.

Filed Oct. 10, 1986, Ser. No. 917,807
Int. Cl.[4] B32B 5/06, 27/00
U.S. Cl. 428—289 18 Claims

1. A moldable textile material partially impregnated with a variably stiffening polymer rigidifier comprising:

a needled non-woven fabric substrate comprising one or more fibers selected from the group consisting of polyesters, polyacrylics, polyester, copolymers, polyacrylic copolymers, wool, cotton, consensation polymers of diamines and dicarboxylic acids, caprolactam based polymers and regenerated cellulose based polymers; and

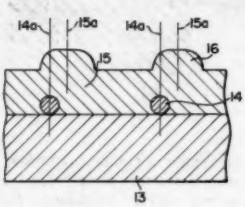
a latex impregnant comprising at least about 25 percent by weight of water, one or more fillers selected from the group consisting of calcium carbonate, clay and zinc oxide, and one or more stiffeners selected from the group consisting of polystyrene, styrene acrylates, styrene-acrylonitrile, styrene-acrylonitrile-butadiene, styrene butadiene, carboxylated styrene-butadiene, polyvinyl chloride, polyvinyl acetate, alkyl acrylates, polyvinylidene chloride, ethylene vinyl chloride and copolymer and terpolymer of the foregoing resins, the fabric substrate being needled in sheet form to a thickness of between about 75 and about 450 mils and said latex penetrating at least 10% of the thickness of the substrate.

4,673,617

THIN FILM MAGNETIC RECORDING MEDIA

Hideki Yoshida, Nishinomiya; Koichi Shinohara, Kobe, and Takashi Suzaki, Takatsuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 25, 1985, Ser. No. 727,083
Int. Cl.[4] G11B 5/62
U.S. Cl. 428—323 2 Claims



1. A thin film magnetic recording medium comprising:

shape imparting particles disposed on a substrate; and

a thin-film layer including at least a magnetic layer formed on said shape imparting particles,

wherein the center line of each of the projecting portions of said thin-film layer which are formed by virtue of said shape imparting particles is not coincident with the center line of the corresponding shape imparting particle.

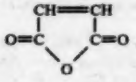
4,673,618

THERMAL RECORDING MEDIUM

Kunihiro Koshizuka; Takao Abe; Shigehiro Kitamura, and Hiroshi Watanabe, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Apr. 17, 1985, Ser. No. 724,102
Claims priority, application Japan, Apr. 25, 1984, 59-81689; May 9, 1984, 59-91115
Int. Cl.[4] B41M 5/26
U.S. Cl. 428—336 14 Claims

1. A thermal recording medium on a support, said thermal recording medium having a heat-transferable coloring agent layer, wherein said coloring agent layer contains a heat fusible copolymer which has monomer units of olefin compound $CHR{=}CH_2$ and maleic anhydride



wherein R is an alkyl group having not more than 100 carbon atoms, and

wherein said heat fusible copolymer has melting point of from 45° C. to 85° C.

4,673,619

POLYETHYLENE STRETCHED FILM

Yasushi Itaba, Tokyo; Tadao Yoshino, Saitama; Yutaka Yoshifuji, Saitama; Keichiro Saito, Saitama, and Jyoichi Tabuchi, Saitama, all of Japan, assignors to Toa Nenryo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 682,864, Dec. 18, 1984, Pat. No. 4,636,340.
This application Aug. 15, 1986, Ser. No. 896,798
Claims priority, application Japan, Jan. 23, 1984, 59-8418
Int. Cl.[4] B32B 7/02
U.S. Cl. 428—338 7 Claims

1. An oriented polyethylene film produced by:

(a) crosslinking opposite surfaces of a sheet of polyethylene having a density greater than 0.935 and containing from 0.02 to 1 part by weight per 100 parts by weight polyethylene of particulate inorganic compound selected from the group consisting of zeolite, silica, alumina, and bentonite, having an average particle size less than 20 microns, said crosslinking producing gel fractions in opposite outer layer portions of the sheet of 20–70% and a gel fraction in a middle layer portion of the sheet of 0–5%; and

(b) heating and stretching the crosslinked sheet under conditions to orient the polyethylene molecules; said film having a haze value less than 7%, a coefficient of friction less than 0.6, a value of antiblocking less than 50 g/cm^2, and a vapor transmission rate lower than

$$Y = 17X^{-1}$$

where Y is the water transmission rate (g/m^2/24 hours) and X is the film thickness (microns).

4,673,620

ELASTOMERIC THERMOPLASTIC LOW VOLTAGE INSULATION ON CONDUCTIVE SUBSTRATE

Cindy B. Shulman, Cliffside Park, and Lawrence Spenadel, Westfield, both of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation of Ser. No. 584,158, Feb. 27, 1984, abandoned.
This application Sep. 24, 1986, Ser. No. 910,880
Int. Cl.[4] B32B 15/00
U.S. Cl. 428—379 14 Claims

1. In an insulated, electrically conductive substrate the improvement comprising the use, as the insulation, of a nonvulcanized, thermoplastic elastomeric blend composition comprising (a) polypropylene reactor copolymer, polybutylene, or mixtures thereof, and (b) copolymer of ethylene and an unsaturated ester of a lower carboxylic acid, and (c) olefinic elastomer, and (d) a mineral filler or carbon black filler or mixtures thereof, and, optionally, a hydrocarbon process oil, wherein said olefinic elastomer is selected from the group consisting of ethylene copolymer elastomers and ethylene terpolymer elastomers containing between about 50 and about 70 weight percent ethylene, polyisobutylene, isobutylene-isoprene copolymers elastomers and halogenated isobutylene-isoprene copolymer elastomers.

4,673,621
SURFACE-RELEASING AGENT AGAINST STICKING ADHESIVE

Hironao Fujiki; Koichi Yamaguchi, and Yasushi Yamamoto, all of Gunma, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Mar. 21, 1986, Ser. No. 842,542
Claims priority, application Japan, Apr. 1, 1985, 60-68760
Int. Cl.[4] B32B *7/04*
U.S. Cl. 428—420 3 Claims

1. In a method for imparting surface-releasability to a substrate surface wherein a surface-releasing agent is applied to the substrate surface, the improvement which comprises the surface releasing agent comprising

(a) a solvent; and

(b) a copolymer dissolved in the solvent which is prepared by the polymerization of a monomer mixture consisting essentially of

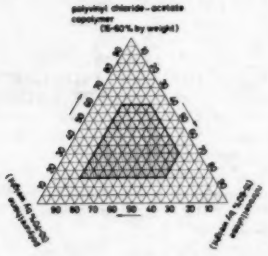
(1) from 50 to 99.5% by weight of a polyfluoroalkyl vinyl monomer, and

(2) from 0.5 to 50% by weight of an organosilyl-substituted vinyl monomer having at least one hydrolyzable group bonded to the silicon atom in a molecule.

4,673,622
MAGNETIC RECORDING MEDIUM

Noribumi Kajimoto, Saku; Yoshio Kawakami, Toubu, and Masahiro Takizawa, Saku, all of Japan, assignors to TDK Electronics Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 388,054, Jun. 14, 1982, abandoned.
This application Feb. 7, 1984, Ser. No. 577,317
Claims priority, application Japan, Jun. 19, 1981, 58-94012
Int. Cl.[4] B32B *27/00*
U.S. Cl. 428—423.1 8 Claims

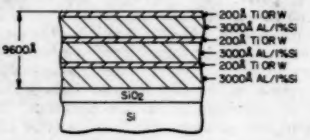


1. A magnetic recording medium comprising a base, a coating for magnetic recording formed on one side of said base coating formed on the other side of said base, said back coating comprising a nonmagnetic powder and a binder consisting essentially of nitrocellulose, vinyl chloride-vinyl acetate copolymer, polyurethane, and an isocyanate compound, said nonmagnetic powder being dispersed in said binder, said nitrocellular in an amount sufficient to result in a drop in video sound to noise ratio of less than about 10 percent when compared to a magnetic recording medium identical to said magnetic recording medium but with no back coating.

4,673,623
LAYERED AND HOMOGENEOUS FILMS OF ALUMINUM AND ALUMINUM/SILICON WITH TITANIUM AND TUNGSTEN FOR MULTILEVEL INTERCONNECTS

Donald S. Gardner, Mt. View; Krishna C. Saraswat, Cupertino, and Troy W. Barbee, Jr., Palo Alto, all of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed May 6, 1985, Ser. No. 731,174
Int. Cl.[4] H01L *23/48*
U.S. Cl. 428—620 15 Claims

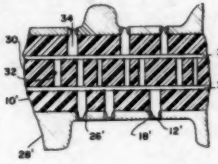


1. In a semiconductor device, a conductive interconnect level formed on a silicon substrate, including an aluminum silicon titanium alloy wherein said titanium is 2–3.5 at. % of said alloy.

4,673,624
FUEL CELL

Robert G. Hockaday, 954 Capulin Rd., Los Alamos, N. Mex. 87544

Filed Feb. 8, 1984, Ser. No. 577,956
Int. Cl.[4] H01M *4/86*
U.S. Cl. 429—41 11 Claims



1. Fuel cell apparatus comprising porous membrane means, electrolyte disposed within pores created by charged particle bombardment and enlarged by chemical etching of the porous membrane means, a metal film electrode coating means mounted on faces of the porous membrane means and small catalyst ring means on edges of the metal electrode coating adjacent said pores for promoting transformation of chemical and electrical energy.

4,673,625
BATTERY AND HANDLE THEREFOR

Charles P. McCartney, Yorktown; Edward W. Susko, and Joseph T. Crouse, both of Anderson, all of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 4, 1986, Ser. No. 892,626
Int. Cl.[4] H01M *2/10*
U.S. Cl. 429—187 4 Claims

1. In an electric storage battery including a container having a carrying handle pivotal thereon and detachably secured thereto via mounting knobs projecting from opposite endwalls thereof, the improvement comprising:

each said knob comprising a head portion spaced from a said endwall and a substantially cylindrical stem portion of determined diameter extending between, and in contiguous relation to, said endwall and said head portion, said

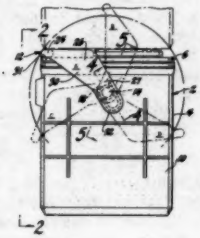
head portion including a flange extending radially outboard said stem portion;

a surface on the stem side of said flange confronting said endwall;

a handle comprising a one-piece plastic molding having a substantially rigid gripping portion and arm portions extending from the opposite ends of said gripping portion to said knobs, said arm portions having sufficient length to permit positioning of said gripping portion above or alongside said battery as desired;

an innerface on each said arm portion confronting a said endwall;

a substantially flat terminal forming the end of each of said arm portions engaging a said knob, said terminal comprising a wall lying inboard of, and substantially parallel to,



said innerface adjacent a said endwall and defining a pocket containing said head, said wall engaging said surface of said flange such as to prevent axial displacement of said terminal with respect to said knob;

a rim of said wall defining a socket in said wall for receiving said stem, said socket having a stem-retention zone and an upwardly opening mouth for the ingress and egress of said stem portion into and out of said zone by movement of said arm longitudinally and parallel to said endwall; and

a pair of opposed projections extending toward each other from said rim into said socket and defining therebetween a gate which is sufficiently narrower than said diameter as to permit manual snapping of said stem into and out of said stem-retention zone to engage/disengage said terminal with/from said knob yet retain said stem in said zone in normal use.

4,673,626

OPTICAL RECORDING CARD WITH OPTICAL RECORDING LAYERS

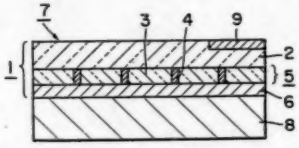
Mitsuru Takeda, Yokohama, and Wataru Kuramochi, Kawagoe, both of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Japan

Filed Mar. 27, 1985, Ser. No. 716,484

Claims priority, application Japan, Mar. 31, 1984, 59-64590; Mar. 31, 1984, 59-64591; Apr. 10, 1984, 59-71582; Apr. 10, 1984, 59-71583

Int. Cl.⁴ G03C *1/62, 1/72;* G01D *15/14*

U.S. Cl. 430—14 **10 Claims**



1. An optical card comprising an optical recording material provided on a card substrate, said optical recording material comprising (a) a substrate for the optical recording material, (b) a first recording layer provided at the lower surface of said substrate for the optical recording material, said first recording layer including light transmissive portions and light screening portions, said first recording layer comprising a photosensitive material including (i) a transparent resin as a binder, (ii) a photodecomposable development restrainer having a diazo or azido group, and (iii) a metal complex compound or a metal compound which is reduced to form metal nuclei, and (c) a second recording layer provided at the lower surface of said first recording layer, said second recording layer comprising a reflective metallic thin film onto which information can be written using said light transmissive portions and said light screening portions as track information, wherein said optical recording material is provided on said card substrate so that said second recording layer comes into contact with said card substrate.

4,673,627

ELECTROPHOTOGRAPHIC LITHOGRAPHIC PRINTING PLATE

Kenji Kunichika; Yoshikatsu Kagawa; Chikashi Ohishi; Sho Nakao, and Yasuzi Asao, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 26, 1985, Ser. No. 813,329

Claims priority, application Japan, Dec. 27, 1984, 59-273581; Dec. 27, 1984, 59-273582; Dec. 27, 1984, 59-273583; Dec. 27, 1984, 59-273584; Dec. 27, 1984, 59-273585

Int. Cl.⁴ G03G *5/087, 13/28*

U.S. Cl. 430—49 **19 Claims**

1. An electrophotographic lithographic printing plate comprising an electrically conductive support and a photoconductive layer on the support, said photoconductive layer being made mainly of a photoconductive zinc oxide and a non-crosslinkable resin binder which does not contain ethylenic double bonds which if present would render the resin radiation curable, wherein in the surface of the photoconductive layer, the degree of exposure of photoconductive zinc oxide is regulated to be from 10% to 70% by subjecting the photoconductive layer to plasma treatment, corona discharge treatment, flame treatment, electron beam treatment of ion beam treatment.

4,673,628

IMAGE FORMING MEMBER FOR ELECTROPHOTOGRAPHY

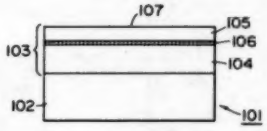
Eiichi Inoue, Tokyo; Isamu Shimizu, and Toshiyuki Komatsu, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 131,495, Mar. 18, 1980, abandoned. This application Mar. 16, 1982, Ser. No. 358,536

Claims priority, application Japan, Mar. 26, 1979, 54-35313

Int. Cl.⁴ G03G *5/082, 5/14*

U.S. Cl. 430—58 **68 Claims**



1. An image-forming member for electrophotography comprising a substrate, a photoconductive layer, said photoconductive layer comprising an amorphous inorganic semiconductor layer having effective dark resistance for forming electrophotographic images overlying said substrate and a hydrogenated amorphous silicon layer containing from 1 to 40 atomic percent of hydrogen laminated to said semiconductor layer whereby a heterojunction is provided in the contact portion between the hydrogenated amorphous silicon layer and the

inorganic semiconductor layer, and a charge transportation layer on said photoconductive layer.

4,673,629

PHOTORECEPTOR HAVING AMORPHOUS SILICON LAYERS

Toshinori Yamazaki; Tatsuo Nakanishi; Yuji Marukawa, all of Hachioji; Shigeki Takenouchi, Chofu, and Hiroyuki Nomori, Hachioji, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Dec. 26, 1985, Ser. No. 813,619

Claims priority, application Japan, Dec. 31, 1984, 59-277818; Feb. 8, 1985, 60-23105; Feb. 8, 1985, 60-23106; Feb. 8, 1985, 60-23107; Feb. 8, 1985, 60-23108

Int. Cl.[4] G03G *5/082*

U.S. Cl. 430—58 **28 Claims**

1. A photoreceptor comprising a support bearing thereon a charge transport layer comprising one selected from the group consisting of a-SiC:H, a-SiC:F and a-SiC:H:F, a charge generating layer comprising one selected from the group consisting of a-SiH, a-SiF and a SiH:F, an a-Si type surface modifying layer containing one selected from the group consisting of N, O and C, and an a-Si type consisting of N, O and C, the content of said at least one of N, O and C in said interlayer being less than in said surface modifying layer, said interlayer being interposed between said charge generating layer and said surface modifying layer.

4,673,630

PHOTOCONDUCTIVE FILM AND ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MEMBER CONTAINS AZULENIUM SALT

Kazuharu Katagiri, Tama; Yoshihiro Oguchi, Yokohama; Takeshi Ohtake, Fujisawa; Kozo Arao, Tokyo; Makoto Kitahara, Yokohama, and Yoshio Takasu, Tama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 6, 1985, Ser. No. 741,878

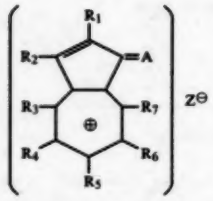
Claims priority, application Japan, Jun. 11, 1984, 59-119411

Int. Cl.[4] G03G *5/06*

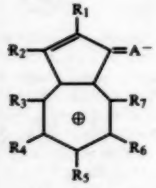
U.S. Cl. 430—72 **19 Claims**

1. A photoconductive film which comprises the azulenium salt compound represented by the formula (I), (II) or (III) as shown below;

(I)

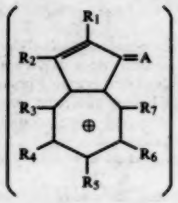


(II)



-continued

(III)



wherein each of R_1, R_2, R_3, R_4, R_5, R_6, and R_7 is hydrogen, halogen, or an organic monovalent residue, and at least one of the combinations (R_1 and R_2), (R_2 and R_3), (R_3 and R_4), (R_4 and R_5), (R_5 and R_6), and (R_6 and R_7) forms a substituted or unsubstituted heterocyclic ring or aliphatic ring; at least one of the combinations (R_1 and R_2), (R_3 and R_4), (R_4 and R_5), (R_5 and R_6), and (R_6 and R_7) may form a substituted or unsubstituted aromatic ring; A is an organic divalent residue linked with a double bond; $Z^{\ominus}$ is an anionic residue.

4,673,631

TONER, CHARGE-IMPARTING MATERIAL AND COMPOSITION CONTAINING METAL COMPLEX

Hiroshi Fukumoto, Kawasaki; Katsuhiko Tanaka, Tokyo, and Yoji Kawagishi, Yawata, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 13, 1985, Ser. No. 808,508

Claims priority, application Japan, Dec. 15, 1984, 59-264756; Dec. 15, 1984, 59-264757; Jan. 12, 1985, 60-3737; Jan. 12, 1985, 60-3738; Jan. 12, 1985, 60-3739; Jan. 25, 1985, 60-10928; Jan. 26, 1985, 60-13121; Jan. 26, 1985, 60-13122

Int. Cl.[4] G03G *9/08*

U.S. Cl. 430—110 **31 Claims**

1. A positively chargeable dry toner for developing electrostatic latent images, comprising:

a binder resin, a colorant and a metal complex of an amino acid compound having an amino or mono-substituted amino group adapted to to complex with said metal, and a carboxyl group adapted to complex with said metal;

said metal complex comprising a complex of said amino acid compound and a divalent or trivalent metal atom selected from the group consisting of Ni, Co, Zn, Cd, Cu, Fe, Mn, Hg, Pb and Cr.

4,673,632

HARDENING METHOD FOR GELATIN

Hisashi Okamura; Hiroshi Kawamoto, and Hisashi Shiraishi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 23, 1985, Ser. No. 726,441

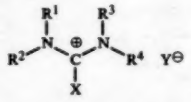
Claims priority, application Japan, Apr. 23, 1984, 59-82215

Int. Cl.[4] C08F *3/34*; C08H *1/06*; C09H *7/00*; G03C *1/30*

U.S. Cl. 430—510 **16 Claims**

1. A hardening method for gelatin which comprises combining gelatin and, as a hardening agent a compound represented by formula (I):

(I)



wherein R^1, R^2, R^3, and R^4, each represents a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkenyl group, a substituted or unsubstituted aralkyl group, or a substituted or unsubstituted aryl group; or two of said R^1, R^2, R^3, and R^4 are combined with each other to form a ring (I); or

3 or more of said R^1, R^2, R^3 and R^4 are combined with each other to form a condensed ring (2); X repreesnts a group which is released when the compound shown by formula (I) reacts with a carboxylic acid group; $Y^{\ominus}$ represents an anion; or $Y^{\ominus}$ is combined with one of X, R^1, R^2, R^3, R^4, ring (1), or ring (2) to form an anionic portion of an intramolecular salt.

4,673,633

METHOD OF DETERMINING CYSTIC FIBROSIS CILIOSTATIC FACTOR

Thomas J. Kelleher, Springlake Heights, and Paul T. Nix, Jackson, both of N.J., assignors to CooperBiomedical, Inc., Malvern, Pa.

Filed Jun. 28, 1984, Ser. No. 625,600
Int. Cl.[4] G01N *1/00, 1/40*
U.S. Cl. 435—4 20 Claims

1. A method for detecting cystic fibrosis ciliostatic factor in mammalian body fluid comprising

contacting an enzyme whose activity is inhibited by cystic fibrosis ciliostatic factor with an amylase-resistant polysaccharide substrate capable of undergoing a chemical reaction catalyzed by said enzyme, and a mammalian body fluid which may contain said cystic fibrosis ciliostatic factor, said amylase-resistant polysaccharide being substantially resistant to reactions catalyzed by enzymes in said body fluid, whereby said substrate is converted to a product by said enzyme at a measurable rate, and

comparing said rate of amylase-resistant polysaccharide conversion to said product with the rate of amylase-resistant polysaccharide conversion to said product by said enzyme in the absence of cystic fibrosis ciliostatic factor,

determining the presence of cystic fibrosis ciliostatic factor from the comparison of rates,

whereby the presence of said cystic fibrosis ciliostatic factor in said body fluid is detected by a decreased rate of substrate conversion to said product relative to the rate of conversion to said product in the absence of said cystic fibrosis ciliostatic factor.

4,673,634

PURIFIED ANTIGEN FROM NON-A, NON-B HEPATITIS CAUSING FACTOR

Belinda Seto, Bethesda, and Robert J. Gerety, Potomac, both of Md., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Mar. 8, 1985, Ser. No. 709,678
Int. Cl.[4] A61K *39/29;* C12Q *1/70;* G01N *33/531, 33/576*
U.S. Cl. 435—5 5 Claims

1. An isolated, purified non-A, non-B hepatitis (NANBH) associated antigen having the following properties:

(a) molecular weight of the monomer on sodium dodecyl sulphate polyacrylamide gel being about 77,000;

(b) the monomer being reactive with rhesus monkey immune serum;

(c) being a glycoprotein containing about 2% carbohydrate comprising substantially mannose and about equal ratio of fucose and galactose;

(d) having an aromatic amino acid composition comprising molecular ratios of phenylalanine, tyrosine and tryptophan of about 3:3:1 respectively; and

(e) being an immunogen.

4,673,635

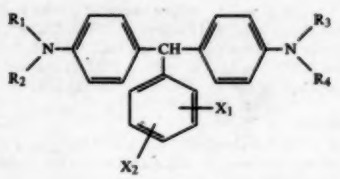
TRIPHENYL METHANE DERIVATIVES AND METHOD OF QUANTITATIVELY MEASURING AN OXIDATIVE SUBSTANCE

Kazuhiko Yamanishi; Akinori Shintani; Satoru Okajima, and Toshiro Hanada, all of Tokyo, Japan, assignors to Wako Pure Chemical Industries Ltd., Osaka, Japan

Division of Ser. No. 649,477, Sep. 11, 1984, Pat. No. 4,613,465. This application Dec. 19, 1984, Ser. No. 683,487
Claims priority, application Japan, Mar. 2, 1984, 59-40031
Int. Cl.[4] C12Q *1/26, 1/28, 1/54, 1/60*
U.S. Cl. 435—10 9 Claims

1. A method for quantitatively measuring an oxidative substance by:

measuring an oxidative substance using, as a coloring component, a triphenyl methane derivative represented by the formula (I):



(I)

wherein

R_1, R_2, R_3 and R_4, independent of each other, represent lower alkyl groups having from 1–3 carbon atoms, and

(i) X_1 and X_2 each represent $—O(CH_2)_nSO_3M$ in which M is a hydrogen atom, an alkali metal ion or NH_4, and n is an integer of 2–4, or

(ii) either X_1 or X_2 represents $—O(CH_2)_nSO_3M$, M and n having the aforesaid meanings as given above, and the other represents a hydrogen atom.

4,673,636

MEDIUM FOR LYSINE DECARBOXYLATION TEST

Takeshi Igarashi, Tama; Toshihiko Endo, Fuji, and Isei Koshi, Fujinomiya, all of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 8, 1985, Ser. No. 720,717
Claims priority, application Japan, May 9, 1984, 59-91065
Int. Cl.[4] C12Q *1/04, 1/10, 1/00;* C12N *1/20*
U.S. Cl. 435—34 9 Claims

1. A culture medium for a lysine decarboxylation test, comprising:

2 to 7 g of yeast extract,

1 to 5 g of peptone,

0.5 to 1.5 g of glucose,

0.3 to 1 g of monoalkali metal dihydrogen phosphate,

10 to 40 g of L-lysine mineral acid salt,

0.01 to 0.08 g of 5′-pyridoxalphosphoric ester, and

0.04 to 0.1 g of a pH indicator,

said culture medium exhibits a pH value of from 5.5 to 6.5 when dissolved in 1 liter of water.

4,673,637

METHOD FOR DETECTING BACTERIA IN URINE AND FOR TREATING RHEUMATOID ARTHRITIS, ESSENTIAL HYPERTENSION AND OTHER DISEASES ASSOCIATED WITH BACTERIURIA

Edward S. Hyman, 3420 Jefferson Ave., New Orleans, La. 70125

Filed Apr. 23, 1984, Ser. No. 603,088
Int. Cl.[4] C12Q *1/04;* G01N *1/00*
U.S. Cl. 435—34 19 Claims

16. A method of detecting bacteria or bacterial fragments in a urine sample, comprising:

(a) centrifuging the sample at a relative centrifugal force of

about 3500–4000 times gravity to sediment bacteria and bacterial fragments;
(b) separating the sediment from the supernatant;
(c) spreading the sediment on a surface;
(d) washing the sediment on the surface with a lipid solvent composition to remove any lipid components of the sediment preparatory to staining;
(e) staining the washed sediment; and
(f) microscopically observing the washed and stained sediment.

4,673,638

METHOD FOR DETECTION AND ISOLATION OF A MICROORGANISM

Josephine Grosch; Gary A. Wilson, both of Elkhart; Karen Wollweber, South Bend, and Clifford O. Yehle, Elkhart, all of Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Continuation of Ser. No. 438,542, Nov. 1, 1982, abandoned. This application Apr. 9, 1985, Ser. No. 721,329
Int. Cl.[4] C12Q *1/04*
U.S. Cl. 435—34 **4 Claims**

1. A method for detecting, identifying and isolating a microorganism which produces a non-secreted desired substance which comprises the steps of:
(a) overlaying a sterile semipermeable membrane on the surface of an agar medium in a predetermined orientation with respect to said agar surface, said agar containing a reagent capable of reacting with said substance produced by a microorganism but not secreted by said microorganism;
(b) inoculating said membrane with an inoculum containing said microorganism and growing said microorganism on said membrane by incubating from 12 to 48 hours;
(c) lysing said microorganism while on said membrane to cause release of said substance and allowing said substance to pass into said agar medium;
(d) removing said membrane from said agar medium;
(e) observing a detectable reaction between said substance and said reagent;
(f) utilizing said predetermined orientation to identify, from a replicate set of plates, the location of said microorganism producing said substance; and
(g) isolating therefrom said microorganism.

4,673,639

DRY FORM MICRONITROUS ACID STREPTOCOCCI EXTRACTION-AGGLUTINATION TEST

Malcolm Slifkin, Pittsburgh, Pa., assignor to Allegheny-Singer Research Institute, Pittsburgh, Pa.

Filed Sep. 9, 1985, Ser. No. 773,586
Int. Cl.[4] C12Q *1/14*
U.S. Cl. 435—36 **14 Claims**

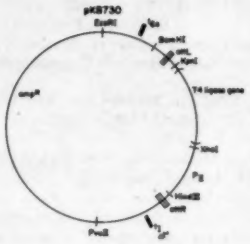
10. A method of detecting streptococci comprising
(a) adding one nitrous acid producing reactant in aqueous form to a vial having a second nitrous acid producing reactant affixed thereto by means of a binder to form nitrous acid,
(b) inoculating a swab with an infected region suspected of including streptococcal antigens and inserting said swab into said vial after formation of nitrous acid therein,
(c) inoculating said receptacle to extract streptococcal antigen present in the swab; and
(d) identifying the presence of extracted antigen with an agglutination agent.

4,673,640

REGULATED PROTEIN PRODUCTION USING SITE-SPECIFIC RECOMBINATION

Keith C. Backman, Bedford, Mass., assignor to Biotechnica International, Inc., Cambridge, Mass.

Filed Apr. 30, 1984, Ser. No. 605,488
Int. Cl.[4] C12P *21/00*; C12N *15/00, 1/20, 1/00*; C07H *15/12*
U.S. Cl. 435—68 **27 Claims**



1. A cell population capable of regulated, synchronized, directional DNA rearrangement from a first configuration to a second configuration responsive to a change from a first environmental condition to a second environmental condition, cells in said population comprising:
(a) DNA encoding a lambda phage site specific recombination enzyme system, said enzyme-encoding DNA comprising int, or a combination of int and xis;
(b) regulatory DNA positioned to express at least one of said int or xis, said regulatory DNA being effective to cause said expression when said cells are exposed to said second environmental condition and to curtail said expression when said cells are exposed to said first environmental condition;
(c) a pair of DNA attachment sites of a lambda phage, said sites being capable, in the presence of said enzyme system, of rapidly undergoing site-specific recombination resulting in a change in the DNA from said first configuration to said second configuration, while avoiding the reverse reaction, thus achieving said synchronized directional DNA rearrangement;
(d) a first segment of a protein-producing gene and a second segment of a protein-producing gene, said segments together comprising protein-encoding DNA and regulatory DNA to express said protein-encoding DNA, said segments being oriented and positioned for protein production only in one of said two configurations, said protein-production configuration being as follows: first segment—attachment site—second segment;
whereby said environmental change causes a synchronized directional rearrangement of DNA in said cells from said first configuration to said second configuration.

25. A method of fermentation of a desired product compound comprising:
(a) culturing the cells of claim 1 under said first environmental condition to a desired population of cells,
(b) changing said environmental condition to said second environmental condition,
(c) producing said compound under said second environmental condition.

4,673,641

CO-AGGREGATE PURIFICATION OF PROTEINS

Henry J. George, Minnetonka; Richard A. Krzyzek, Minneapolis; Lynn W. Enquist, Excelsior, and Roger J. Watson, Minneapolis, all of Minn., assignors to Molecular Genetics Research and Development Limited Partnership, Minnetonka, Minn.

Continuation-in-part of Ser. No. 510,551, Jul. 6, 1983, which is a continuation-in-part of Ser. No. 436,368, Oct. 25, 1982, and a continuation-in-part of Ser. No. 400,028, Jul. 20, 1982, and a continuation-in-part of Ser. No. 450,306, Dec. 16, 1982, abandoned, and a continuation-in-part of Ser. No. 548,917, Nov. 7, 1983, abandoned. This application Jan. 25, 1984, Ser. No. 573,642

Int. Cl.[4] C12P *21/00, 21/02, 21/04;* C12N *15/00, 1/02, 1/00;* C07K *3/24*

U.S. Cl. 435—68 14 Claims

1. A process for stabilizing a foreign polypeptide produced in an *Escherichia coli* cell, comprising culturing an *Escherichia coli* cell capable of co-expressing at least one DNA sequence coding for a foreign polypeptide and at least one DNA sequence coding for an aggregate-forming polypeptide, wherein the DNA sequence coding for the aggregate-forming polypeptide is located on a recombinant vector, such that co-expression of the DNA coding for the foreign polypeptide and the DNA coding for the aggregate-forming polypeptide results in formation of an aggregate containing both the aggregate-forming polypeptide the foreign polypeptide and separating said aggregate from said cell.

4,673,642

PLASMID P SVH 1 AND ITS USE

Alfred Pühler; Wolfgang Wolleben, both of Bielefeld, and Michael Leineweber, Hofheim am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Continuation of Ser. No. 398,895, Jul. 16, 1982, abandoned. This application Aug. 20, 1984, Ser. No. 642,742

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1981, 3128669

Int. Cl.[4] C12P *19/34, 21/00;* C12N *15/00, 1/20, 1/00;* C12R *1/465, 1/61*

U.S. Cl. 435—91 2 Claims

1. Biologically pure plasmid pSVH 1, obtainable from a culture of *Streptomyces venezuelae* DSM 40755, which plasmid has a molecular weight of 8.4 megadaltons, a contour length of 4.1 microns, a molecular size of 12.6 kilobases, is not cleaved by the restriction endonucleases EcoR I, Hind III, Hpa I, and Xba I, is cleaved only once by Pst I and Bcl I, is cleaved by Xho I into two fragments 7.6 and 4.9 kilobases in length, is cleaved by Cla I into two fragments 11.8 and 0.8 kilobases in length, is cleaved by Bgl II into three fragments 7.5, 2.8, and 2.4 kilobases in length, and is cleaved by BamH I into four fragments 7.7, 2.0, 1.8, and 1.2 kilobases in length.

4,673,643

PROCESS FOR THE MANUFACTURE OF ISO-MALTO-OLIGOSACCHARIDE MONOVALENT HAPTENS

Dieter Schwengers, Dormagen, Fed. Rep. of Germany, assignor to Pfeifer & Langen, Cologne, Fed. Rep. of Germany

Filed Jun. 11, 1985, Ser. No. 743,715

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1984, 3422246

Int. Cl.[4] C12P *19/18, 19/08*

U.S. Cl. 435—97 16 Claims

1. A process for the manufacture of iso-malto-oligosaccharide monovalent haptens, comprising adding to an aqueous solution of D-glucose containing more than 300 mmol glucose per 1000 U $\alpha(1\rightarrow6)$-D-glucosyl transferase, at temperatures from 265 to 310 K and at a pH value of 4.5 to 8, an aqueous sucrose solution in such an amount that the molar ratio of sucrose to glucose is 0.5 to 2.0; and by separating, after the consumption of the sucrose glucose, liberated fructose and undesired oligosaccharides.

4,673,644

NOVEL STRAINS OF AGROBACTERIUM AND PREPARATION OF CYCLIC $(1\rightarrow2)$-β-D-GLUCAN

Tokuya Harada, Toyonaka, and Tadashi Higashiura, Ibaraki, both of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

Filed Oct. 24, 1983, Ser. No. 544,998

Claims priority, application Japan, Nov. 1, 1982, 57-193119

Int. Cl.[4] C12P *19/04;* C12N *1/20, 15/00*

U.S. Cl. 435—101 14 Claims

1. A novel strain belonging to the genus Agrobacterium, which produces cyclic β-1,2-glucan and which does not produce acidic extracellular polysaccharides, octasaccharide repeating units thereof and extracellular polysaccharides, wherein said strain is obtained by mutating *Agrobacterium radiobacter* IFO12665.

4,673,645

PROCESS AND MICROORGANISMS FOR PRODUCING MITOMYCIN A BY FERMENTATION

Susumu Tomohiro, Shizuoka; Yuko Arai, Susono, and Kazuyuki Mineura, Matsudo, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Filed Sep. 3, 1982, Ser. No. 414,940

Claims priority, application Japan, Sep. 4, 1981, 56-138364

Int. Cl.[4] C12P *17/18;* C12R *1/465;* C12N *1/20*

U.S. Cl. 435—119 3 Claims

1. A biologically pure culture of *Streptomyces caespitosus* AN-9 (NRRL 12513).

2. A biologically pure culture of *Streptomyces caespitosus* T-17-135 (NRRL 12508).

3. A process for producing mitomycin A by fermentation, which comprises culturing *Streptomyces caespitosus* T-17-135 (NRRL 12508) or *Streptomyces caespitosus* AN-9 (NRRL 12513) in a culture medium, allowing the accumulation of mitomycin A in the culture medium, and recovering mitomycin A therefrom.

4,673,646

PRODUCTION OF 2-HYDROXYMUCONIC SEMIALDEHYDE

Scott Hagedorn, Summit, N.J., assignor to Celanese Corporation, New York, N.Y.

Division of Ser. No. 582,237, Feb. 22, 1984, Pat. No. 4,617,156. This application Aug. 12, 1985, Ser. No. 764,768

The portion of the term of this patent subsequent to Mar. 31, 2004, has been disclaimed.

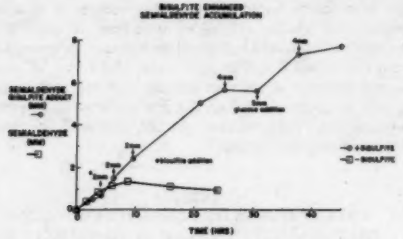
Int. Cl.[4] C12P *7/42;* C12N *15/00, 1/20;* C12R *1/40*

U.S. Cl. 435—146 12 Claims

1. A process for the production of 2-hydroxymuconic se-

mialdehyde or substituted 2-hydroxymuconic semiladehyde comprising

(1) Reacting toluene or substituted toluene with a Pseudomonad bacterial culture in the presence of molecular oxygen, said bacterial culture exhibiting catechol 2,3-oxygenase activity that is not inhibited in the presence of less than about 0.1 gram of 2-hydroxymuconic semialdehyde or substituted 2-hydroxymucoonic semialdehyde per liter of bioconversion medium, and which exhibits no enzymatic activity that metabolizes 2-hydroxymuconic

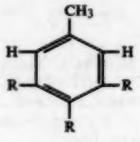


semialdehyde or substituted 2-hydroxymuconic semialdehyde

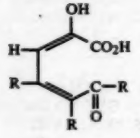
(2) Allowing the 2-hydroxymuconic semialdehyde or substituted 2-hydroxymuconic semialdehyde to accumulate in the bioconversion medium

(3) recovering the 2-hydroxymuconic semialdehyde or substituted 2-hydroxymuconic semialdehyde.

2. A process for the production of a 2-hydroxymuconic semialdehyde type metabolite which comprises reacting an aromatic hydrocarbon corresponding to the formula:



where R is hydrogen or an alkyl group containing between about 1-4 carbon atoms, with Pseodomonad bacterial culture in the presence of molecular oxygen, said culture exhibiting catechol 2,3-oxygenase activity that is not inhibited in the presence of less than about 0.1 gram of a 2-hydroxymuconic semialdehyde metabolite per liter of bioconversion medium, and which lacks active catechol 1,2-oxygenase, 2-hydroxymuconic semialdehyde hydrolase and 2-hydroxymuconic semialdehyde dehydrogenase, wherein the metabolite which is produced to the formulas:



where R is as previously defined,

(3) Allowing said 2-hydroxymuconic semialdehyde type metabolite to accumulate in the bioconversion medium, and

(4) Recovering said 2-hydroxymuconic semialdehyde product.

7. A process in accordance with claim 2 wherein the reaction is conducted under nutrient limited conditions.

4,673,647

PROCESS TO SOLUBILIZE ENZYMES AND AN ENZYME LIQUID PRODUCT PRODUCED THEREBY

Charles E. Brothers, Cassopolis, Mich., and Chong Y. Kim, Elkhart, Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Filed May 6, 1985, Ser. No. 730,864
Int. Cl.[4] C12N 9/02, 9/00, 9/20, 9/28, 9/34, 9/50, 9/56
U.S. Cl. 435—189 29 Claims

1. A process for the recovery of an enzyme product wherein the enzyme is provided by an enzyme-containing solution obtained from an enzyme-producing microorganism, said process comprising:

(a) adding an innocuous precipitation agent to the enzyme-containing solution to form a cake containing an enzyme or enzyme complex which is essentially insoluble in the solution and precipitates therefrom;

(b) separating the cake containing the enzyme or enzyme complex from the solution; and,

(c) contacting the cake with a polyol solvent to solubilize the enzyme or enzyme complex from the cake to provide a polyol solution of the enzyme or enzyme complex, whereby a liquid enzyme product is recovered.

4,673,648

SUNFLOWER REGENERATION THROUGH ORGANOGENESIS

Anne S. Wilcox, Los Altos, and Gloria L. Cooley, Menlo Park, both of Calif., assignors to Sungene Technologies Corporation, Palo Alto, Calif.

Filed Jul. 27, 1984, Ser. No. 635,176
The portion of the term of this patent subsequent to Jun. 2, 2004, has been disclaimed.
Int. Cl.[4] C12N 5/00, 5/02
U.S. Cl. 435—240 29 Claims

1. A process for regenerating sunflower plants from cell or tissue culture through organogenesis which comprises the steps of:

(a) culturing tissue obtained from a sunflower plant on a first medium which comprises mineral salts, vitamins, amino acids, sucrose and a mixture of abscisic acid (ABA) and 6-benzylaminopurine (BA) in an amount sufficient to ensure callus formation;

(b) subculturing said callus on a second medium which comprises mineral salts, vitamins, sucrose and a mixture of indoleacetic acid (IAA) and kinetin in an amount sufficient to ensure shoot formation, and

(c) subculturing said shoot on a third medium which comprises mineral salts, vitamins, sucrose and IAA in an amount sufficient to ensure root formation, whereby plants are obtained.

4,673,649

PROCESS AND DEFINED MEDIUM FOR GROWTH OF HUMAN EPIDERMAL KERATINOCYTE CELLS

Steven T. Boyce, and Richard G. Ham, both of Boulder, Colo., assignors to University Patents, Inc., Del.

Filed Jul. 15, 1983, Ser. No. 514,178
Int. Cl.[4] C12N 5/00, 5/02
U.S. Cl. 435—240 19 Claims

1. A transferrin-free medium suitable for stock culture or clonal growth of a population of human keratinocyte cells in a primary culture comprising:

complete MCDB153;

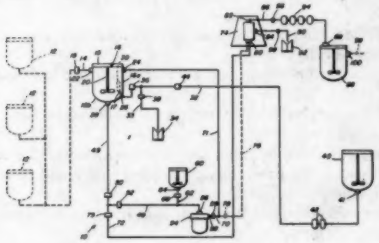
epidermal growth factor at a concentration range of 1.0 mg/ml to 25.0 ng/ml; and

insulin at a concentration range of 0.5 μg/ml to 50.0 μg/ml.

4,673,650
PROTEIN HARVESTING SYSTEM

Braden William L., Norfolk, Mass., assignor to Damon Biotech, Inc., Needham Heights, Mass.

Filed Mar. 28, 1986, Ser. No. 845,503
Int. Cl.[4] C12M *3/02*
U.S. Cl. 435—286 17 Claims



1. Apparatus for the recovery of cell product contained within capsules in admixture with gellable material and cells, said capsules being disposed in a medium, said apparatus comprising a plurality of stations including:

(a) a first vessel for holding said capsules and medium, said vessel having at least one intake port for introducing material to the vessel, at least one output port for draining liquids from said vessel, and means for precluding passage of said capsules from said veseel while permitting passage of liquids;

(b) a source of wash solution in selective fluid communication with said first vessel;

(c) means for mechanically disrupting the capsule membranes without substantially disrupting the cell membranes, in fluid communication with the output port of said first vessel, to produce a homogenate comprising a solid phase of capsule debris and cells and a liquid phase comprising dissolved cell product, said means including a homogenate output port for the discharge of homogenate;

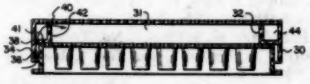
(d) a selectively operable source of gelling reagent, disposed upstream of and in fluid communication with said means for disrupting, for mixing said gelling reagent with said gellable material;

(e) means for separating the solid and liquid components of said homogenate solution, said separating means being in fluid communication with the homogenate output port of said means for disrupting, to yield a liquid cell product-rich solution substantially free of cells, gellable material, and capsule debris.

4,673,651
MULTI-CELL TRAY

Barry E. Rothenberg, 232 Barbara Ave., and James O. Billups, Jr., 143 S. Cedros Ave., both of Solana Beach, Calif. 92075

Filed Mar. 15, 1985, Ser. No. 712,413
Int. Cl.[4] C12M *1/20*
U.S. Cl. 435—301 5 Claims



1. A multi-cell tray, comprising:

a base having an upper wall and side walls defining an outer periphery;

a plurality of cells in the upper wall of said base within a cell area, the cells having openings at a level for receiving test media;

a removable cover on said base comprising side walls extending downwardly from an upper wall, the side walls of the base and cover being spaced from one another to define first passageway means;

baffle means encompassing the cell area and extending upwardly from the upper wall of the base for deflecting incoming gas upwardly away from the level of said cell openings, and having second passageway means uppermost of said baffle means;

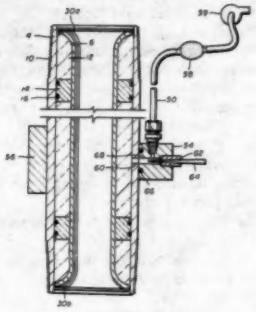
the upper walls of said cover and base and said baffle means together forming a chamber above said cells;

wherein incoming gas first enters said first passageway means, is then deflected upwardly by said baffle means, and enters into said chamber by said second passageway means, to thereby distribute gas flow substantially evenly around said chamber.

4,673,652
METHOD OF TESTING AND RECONDITIONING INSULATING TUBULAR CONDUITS

David M. McStravick, Houston, Tex.; David V. Chenoweth, Lahaina, Hi., and David M. Anderson, Whittier, Calif., assignors to Baker Oil Tools, Inc., Orange, Calif.

Continuation of Ser. No. 433,581, Oct. 12, 1982, abandoned.
This application Dec. 1, 1986, Ser. No. 936,222
Int. Cl.[4] G01N *33/18*
U.S. Cl. 436—2 1 Claim



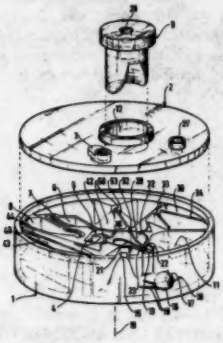
1. A method of indirect, non-destructive on-site inspection, testing and repair of the insulating capacity of a tubular fluid transmission conduit installed in a subterranean well, comprising the steps of: providing a plurality of threadably interconnected concentric walled insulating tubular sections, each tubular section having an individually sealed annular insulating cavity between said concentric walls disconnecting the insulating tubular sections at the well surface; separately exposing each of said annular insulating cavity of each tubular section to a precalibrated moisture sensitive means to determine the amount of water, in the liquid and vaporous state, present in each said annular cavity; determining the insulating performance of each tubular section according to a preselected moisture level above which the tubular section is unacceptable; exposing the annular insulating cavity of each unacceptable tubular section to a vacuum means to reduce the moisture to an acceptable level; and thereafter resealing the annular insulating cavity of each such unacceptable tubular section.

4,673,653

METHOD OF PERFORMING BIOLOGICAL ANALYSES USING IMMUNOLOGICAL REACTIONS, AND APPARATUS FOR PERFORMING THE METHOD

Jean Guigan, 9, rue Jean Mermoz, 75008 Paris, France

Filed Mar. 17, 1986, Ser. No. 840,613
Claims priority, application France, Mar. 26, 1985, 85 04476
Int. Cl.[4] G01N *31/00, 33/549*
U.S. Cl. 436—8 2 Claims



1. A method of performing biological analyses using immunological reactions on a liquid sample, the method comprising the steps of:

providing a container which is closed by a lid, said container having compartments to define:

a storage chamber for said liquid sample, said storage chamber being connected by a capillary duct to one end of a calibrated cell whose other end is connected via a capillary duct to an overflow chamber;

a plurality of liquid storage chambers, for storing liquids such as a conjugate liquid, a substrate liquid, and a blocking liquid, said liquid storage chambers being disposed around a pouring chamber, said pouring chamber being connected to each of said liquid storage chambers and to said calibrated cell via respective capillary ducts extending in various directions, said pouring chamber also communicating with a reaction vat via a spout preventing liquid from returning from said reaction vat to said pouring chamber;

a liquid drain tank communicating with said reaction vat; and

a bead fixed in said reaction vat and suitable for being covered with antigens or antibodies;

said lid being provided with:

an insertion receptacle for receiving a sample and communicating directly with said sample storage chamber, said insertion receptacle being situated above said sample storage chamber; and

a removable stopper penetrating into said pouring chamber to close the ends of said capillary ducts leading thereto; and a closable opening communicating directly with said reaction vat to enable a cleaning liquid to be inserted therein;

means being provided for positioning said container on the periphery of a turntable in a plurality of different predetermined positions, which positions differ from one another by said container being rotated about its own axis through a given angle relative to said turntable;

said conjugate liquid, said substrate liquid, and said blocking liquid being initially disposed in respective ones of said liquid storage chambers;

said sample being inserted into said sample insertion receptacle, and flowing therefrom under gravity into said sample storage chamber;

said stopper being removed;

said container being placed on said turntable in order to perform a plurality of successive centrifuging operations, with the angular position of said container being selected each time from said predetermined angular position as a function of the orientation of the capillary duct concerned relative to the direction of centrifugal force in such a manner as to perform the following sequence of operations:

passing said sample from said storage chamber into said calibrated cell;

passing said sample from said calibrated cell into said reaction vat;

eliminating surplus sample which is not fixed on said bead to said drain tank;

inserting said flushing liquid into said reaction vat to clean said bead a first time, then eliminating said liquid to said drain tank;

inserting said conjugate liquid into said reaction vat via said pouring chamber;

eliminating surplus conjugate liquid which is not fixed on said bead into said drain tank;

inserting said flushing liquid into said reaction vat to clean said bead a second time and eliminating said liquid to said drain tank;

inserting said substrate liquid into said reaction vat via said pouring chamber;

eliminating surplus substrate liquid which is not fixed on said lead into said drain tank;

inserting said blocking liquid into said reaction vat via said pouring chamber; and

then reading the reaction on said bead by optical analysis means.

4,673,654

COMPOSITION FOR DETERMINING PEROXIDASE-LIKE ACTIVITY OF HEMOGLOBIN

Joseph M. Talmage, Landing, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Oct. 31, 1985, Ser. No. 793,602
Int. Cl.[4] G01N *31/22, 33/72;* C12Q *1/28*
U.S. Cl. 436—66 11 Claims

1. A reagent for the determination of peroxidase-like activity in aqueous media comprising:

(a) a 3,3',5,5'-tetramethylbenzidine coated with a water soluble polymer on an inert water soluble material; and

(b) an alkali metal perborate.

4,673,655

METHOD OF ANALYZING OXYGEN OR NITROGEN CONTAINED IN TITANIUM GROUP METAL OR ALLOY THEREOF

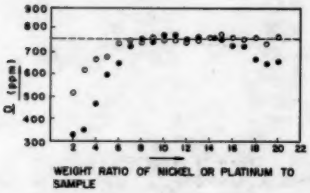
Masayoshi Okamura, Kobe; Kiyoshi Matsuda, Takasago; Hironichi Yamada, Akashi; Hiromi Umeda, and Masami Tomimoto, both of Himeji, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed May 30, 1985, Ser. No. 739,271
Claims priority, application Japan, Jun. 1, 1984, 59-113762; Jun. 1, 1984, 59-113763
Int. Cl.[4] G01N *33/20;* C01G *23/00;* C22C *14/00*
U.S. Cl. 436—75 4 Claims

1. A method for quantitatively analyzing the oxygen-content of a titanium group metal or an alloy of a titanium group metal, said method comprising:

(i) melting a sample of a titanium group metal or alloy in an inert atmosphere in the presence of nickel, said nickel being in wire or plate form and present in an amount

corresponding to 7 to 17 times by weight the weight of said sample;



(ii) allowing the oxygen contained in the titanium to react with carbon to obtain carbon monoxide; and

(iii) subjecting the carbon monoxide to quantitative analysis.

4,673,656

AEROSOL PRODUCTION IN INDUCTIVELY COUPLED PLASMA EMISSION SPECTROSCOPY

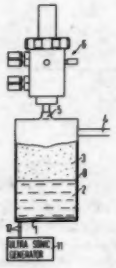
Hans Pink, Starnberg/See, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 24, 1985, Ser. No. 747,957

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1984, 3425549

Int. Cl.⁴ G01N *21/73*

U.S. Cl. 436—173 **6 Claims**



1. A process for producing an aerosol of a sample liquid to be analyzed by means of an inductively coupled plasma emission zone, said process comprising the steps of:

(A) charging a quantity of such a sample liquid into a gravitationally lower portion of a sealed chamber,

(B) contacting said sample liquid quantity with an ultrasonic oscillator means,

(C) oscillating said oscillator means at an ultrasonic frequency to an extent sufficient to form an aerosol comprised of a portion of said sample liquid in a gravitationally upper portion of said sealed chamber,

(D) passing for a predetermined time interval a substantially inert carrier gas into an entry port defined in said sealed chamber, through said upper portion, and out from an exit port defined in said sealed chamber, thereby to sweep a portion of said aerosol in a uniform manner out of said sealed chamber in admixture with said carrier gas,

(E) concurrently feeding such mixture of said carrier gas and said aerosol from said sealed chamber into said plasma emission zone, whereby said sample liquid is spectroscopically analyzable, and thereafter

(F) terminating said steps (C), (D) and (E) and condensing residual portions of said aerosol which remain in said sealed chamber.

4,673,657

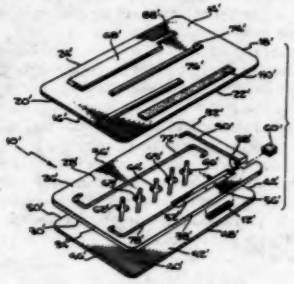
MULTIPLE ASSAY CARD AND SYSTEM

Clifford N. Christian, Costa Mesa, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Continuation-in-part of Ser. No. 526,970, Aug. 26, 1983, abandoned. This application Jun. 1, 1984, Ser. No. 616,395

Int. Cl.⁴ G01N *33/53, 33/543*

U.S. Cl. 436—501 **27 Claims**



1. An assay card adapted for treating and analyzing a sample comprising:

a solid bottom plate having a top surface, a front end, a rear end and sides extending between said front and rear ends;

a top plate having a bottom surface, a front end, a rear end and sides extending between said front and rear ends;

a middle plate having a top surface, a bottom surface, a front end, a rear end and sides extending between said front and rear ends, said middle plate being sandwiched between said bottom and top plates so that said middle plate top surface is adjacent to said top plate bottom surface and said middle plate bottom surface is adjacent said bottom plate top surface;

a sample slot in said middle plate adapted to receive and hold an assay rod, said slot extending from said middle plate top surface to said middle plate bottom surface, said slot defining an assay rod chamber located between said top and bottom plates;

a flexible indentation in said top plate bottom surface extending away from said middle plate which defines a solution chamber between said top plate bottom surface and said middle plate top surface;

conduit means betwen said solution chamber and assay rod chamber for providing conduits through which solution can be transferred between said assay rod chamber and said solution chamber; and

means associated with said assay rod chamber for introducing said sample into said assay rod chamber to interact with an assay rod located therein, said flexible top plate being deformable towards said middle plate at said indented portion defining said solution chamber to force solution through said conduit means to provide transfer of solution between said assay rod chamber and said solution chamber to provide treatment of said assay rod with said solution.

15. A method for treating and analyzing a sample comprising the steps of:

providing an assay card comprising:

a solid bottom plate having a top surface, a front end, a rear end and sides extending between said front and rear ends;

a top plate having a bottom surface, a front end, a rear end and sides extending between said front and rear ends;

a middle plate having a top surface, a bottom surface, a front end, rear end and sides extending between said front and rear ends, said middle plate being sandwiched between said bottom and top plates so that said middle plate top surface is adjacent to said top plate bottom

surface and said middle plate bottom surface is adjacent said bottom plate top surface;

a sample slot in said middle plate adapted to receive and hold an assay rod, said slot extending from said middle plate top surface to said middle plate bottom surface, said slot defining an assay rod chamber located between said top and bottom plates;

a flexible indentation in said top plate bottom surface extending away from said middle plate which defines a solution chamber between said top plate bottom surface and said middle plate top surface;

conduit means between said solution chamber and assay rod chamber for providing conduits through which solution can be transferred between said assay rod chamber and said solution chamber;

introducing said sample into said assay rod chamber to interact with an assay rod located therein; and

deforming said flexible indentation in said top plate towards said middle plate to force solution through said conduit means to provide transfer of solution to said assay rod chamber by peristaltic action to provide treatment of said assay rod with said solution.

4,673,658

CORDIERITE CERAMICS CONTAINING SILICON CARBIDE WHISKER REINFORCEMENT

Kishor P. Gadkaree, Big Flats; Max R. Montierth, Elmira, and Mark P. Taylor, Painted Post, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Apr. 25, 1986, Ser. No. 855,687

Int. Cl.[4] C04B *35/56, 35/18, 35/20*

U.S. Cl. 501—89 **7 Claims**

1. A whisker-reinforced polycrystalline cordierite ceramic product having:

(a) an oxide crystal phase constituting 60–95% by weight of the product and consisting at least predominantly of cordierite;

(b) a silicon carbide whisker phase constituting 5–40% by weight of the product, the silicon carbide whiskers having a diameter not exceeding about 3 microns and a length not exceeding about 30 microns;

(c) a composition consisting essentially, in weight percent, of about 5–40% SiC, 25–54% SiO_2, 18–48% Al_2O_3, and 5–19% RO, wherein RO consists essentially of MgO and, optionally, one or more oxides in partial substitution for MgO selected in proportions up to the indicated mole fraction of total RO content from the group consisting of: up to 0.98 MnO, up to 0.25 NiO, up to CoO, and up to 0.40 FeO, but not exceeding 0.98 total of MnO+NiO+CoO+FeO; and

(d) a modulus of rupture strength in excess of 5,000 psi.

4,673,659

LIGHTWEIGHT CONCRETE ROOF TILES

John W. M. Wood, Bromley, and Richard C. Hack, Sidcup, both of United Kingdom, assignors to Marley Tile AG, Zurich, Switzerland

Filed Jan. 9, 1985, Ser. No. 689,962

Claims priority, application United Kingdom, Aug. 24, 1984, 8421605

Int. Cl.[4] C04B *7/02*

U.S. Cl. 106—98 **13 Claims**

1. In a method of producing concrete roof tiles in which a mix comprising cement/aggregate/water is shaped by the roller and slipper method to obtain a shaped extrudate which is divided to form sections and the sections are cured; wherein the improvement comprises the use of a lightweight aggregate in said cement/aggregate/water mix, said mix additionally containing a non-thixotropic silica fume in a weight ratio of silica fume, calculated as dry weight, to cement within the range of from about 2:98 to about 25:75, an effective amount of a dispersing agent for said silica fume, and the weight ratio of water:cementitious materials in said mix being within the range of from about 0.45:1 to about 1:1, to form lightweight concrete roof tiles.

4,673,660

CIRCUIT SUBSTRATE

Truong D. Thanh, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 26, 1986, Ser. No. 878,780

Claims priority, application Japan, Jun. 27, 1985, 60-138918

Int. Cl.[4] C04C *35/46, 35/14*

U.S. Cl. 501—135 **4 Claims**

1. A circuit substrate comprising a sintered oxide body used as an insulating body, said sintered oxide body consisting essentially of barium, tin, boron, titanium, silicon, and manganese according to a converted equivalent composition of:

BaO	10 to 55 mol %;
SnO_2	2 to 45 mol %;
B_2O_3	5 to 40 mol %;
TiO_2	0.1 to 25 mol %;
SiO_2	0.5 to 30 mol %; and
MnO	0.5 to 7 mol %.

4,673,661

CATALYST COMPONENTS, A CATALYST AND A PROCESS FOR THE POLYMERIZATION OF OLEFINS

Barbro U. Löfgren, Helsinki, Finland; Luciano Luciani, Ferrara, Italy; Hanneli Seppänen; Maria H. Stjernberg, both of Helsinki, and Eero I. Iiskola, Porvoo, all of Finland, assignors to Neste Oy, Espoo, Finland

Filed Jan. 21, 1986, Ser. No. 821,070

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1985, 3501858

Int. Cl.[4] C08F *4/64*

U.S. Cl. 502—111 **23 Claims**

1. In a process for making a solid non-layer catalyst component for use in catalysts for the polymerization of at least one olefin, which process comprises chlorinating at least one organic magnesium compound of the formula $MgR'R''$ wherein R' and R'' are the same or different and each is an alkyl group of 1 to 20 carbon atoms, with at least one chlorinating agent to form a carrier, contacting the carrier thus obtained with liquid titanium tetrachloride in the presence of an electron donor selected from the group consisting of inorganic and organic esters, amines, ethers, alcoholates, silane compounds, ketones, and phosphor amides at −25° to 180° C.; and recovering said solid non-layer catalyst component, the improvement which comprises employing as said chlorinating agent chlorine gas or a mixture of chlorine gas and alkyl chloride and contacting said carrier first with titanium tetrachloride, then with said electron donor compound and after that at least once with titanium tetrachloride in the absence of said electron donor compound.

2. A process according to claim 1 in which said carrier is contacted with a silicone oil and an aliphatic or aromatic alcohol before contacting with titanium tetrachloride.

4,673,662

CATALYSTS FOR THE POLYMERIZATION AND COPOLYMERIZATION OF PROPYLENE AND POLYMERIZATION PROCESSES USING THESE CATALYSTS

Jean C. Bailly, Martigues, France, assignor to BP Chemicals Limited, London, England

Division of Ser. No. 504,981, Jun. 16, 1983, Pat. No. 4,511,703. This application Jan. 15, 1985, Ser. No. 691,539
Claims priority, application France, Jun. 24, 1982, 82 11056
The portion of the term of this patent subsequent to Dec. 11, 2001, has been disclaimed.
Int. Cl.[4] C08F 4/02, 4/64
U.S. Cl. 502—115 8 Claims

1. A supported catalyst prepared by the following series of steps in sequence comprising

(1) reacting an organomagnesium compound with a chlorinated organic compound, and optionally with an organoaluminium compound, in the presence of an electron donor compound (a) comprising an organic compound comprising at least one atom of oxygen, sulphur, nitrogen and/or phosphorus to produce the support,

said support containing essentially magnesium chloride and optionally a chlorinated derivative of aluminium, said electron donor compound (a) and not containing any product having an Mg—C bond, this support having a density comprised between 1.2 and 2.1, a specific surface area comprised between about 20 and 60 m^2/g (BET) and occurring in the form of spheroidal particles defined by the fact that if D and d are respectively the large and the small diameters of the particles, the ratio D/d is less than or equal to 1.3, and having a mean diameter by mass comprised between 10 and 100 microns and a narrow particle size distribution, such that the ratio of the mean diameter by mass, Dm, to the mean diameter by number, Dn, is less than or equal to 3,

(2) treating said support (1) by means of an electron donor compound (b) chosen form among the aromatic acid esters and the aromatic ethers and at a temperature comprised between 20° C. and 50° C. approximately with the electron donor compound employed in a quantity comprised between 0.06 and 0.2 mole of electron donor compound per mole of magnesium chloride support, and

(3) impregnating said treated support (2) by means of titanium tetrachloride in a quantity such that the supported catalyst comprises 0.5 to 3% of atoms of titanium per atom of magnesium,

and wherein the impregnation of the said support by titanium tetrachloride is carried out between 80° C. and 100° C. approximately to produce said supported catalyst,

with the proviso that the catalyst contains the electron donor compound (b) but does not contain electron donor compund (a) in the catalyst final product.

4,673,663

CATALYST SUPPORT AND PROCESS FOR PREPARING SAME

Claude Magnier, Paris, France, assignor to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

Continuation of Ser. No. 452,089, Dec. 22, 1982, abandoned. This application Mar. 19, 1984, Ser. No. 591,054
Claims priority, application France, Jun. 22, 1981, 81 12187
Int. Cl.[4] B01J 23/26
U.S. Cl. 502—320 20 Claims

1. A catalyst support comprising a metal substrate, a layer consisting essentially on said substrate of chromium electrolytically deposited and a layer of alumina deposited over said layer of chromium.

4,673,664

SHAPE FOR EXTRUDED CATALYST SUPPORT PARTICLES AND CATALYSTS

William E. Bambrick, Old Greenwich, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Oct. 7, 1985, Ser. No. 785,185
Int. Cl.[4] B01J 35/02
U.S. Cl. 502—439 6 Claims

1. A helical shaped, extrudate particle of extruded catalyst material or catalyst support material having the outline shape of three to four segments helically wound about the axis of extrusion along the length of the particle, and filled with extruded material within said outline shape.

4,673,665

PROCESS FOR TREATING ANESTRUS IN EWES OR BEEF CATTLE

Rainer Humke, Kelkheim, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 6, 1983, Ser. No. 456,253
Claims priority, application Fed. Rep. of Germany, Jan. 9, 1982, 3200459
Int. Cl.[4] A61K 37/24, 37/38
U.S. Cl. 514—15 3 Claims

1. A method for treating anestrus in a ewe, heifer, or cow, which comprises treating the animal for 4 to 16 days with a gestagen and, following this treatment, continuously administering LH-RH or an analogous compound having at least the same efficiency intravenously, by infusion, or by implant for 2 to 6 days to bring about an LH plasma level sufficient to induce ovulation preceded by a fertile estrus and followed by normal luteal function.

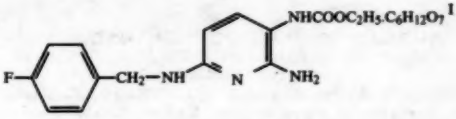
4,673,666

2-AMINO-3-ETHOXYCARBONYLAMINO-6-(P-FLUORO-BENZYLAMINO)-PYRIDINE GLUCONATE AND PHARMACEUTICAL PREPARATIONS CONTAINING IT

Helmut Hettche, Offenbach; Peter Emig, Niederdorfelden, and Jurgen Engel, Alzenau, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed May 1, 1985, Ser. No. 729,413
Claims priority, application Fed. Rep. of Germany, May 5, 1984, 3416609
Int. Cl.[4] A61K 31/70; C07H 3/02
U.S. Cl. 514—23 18 Claims

1. 2-amino-3-ethoxycarbonylamino-6-(p-fluoro-benzylamino)-pyridine gluconate of the formula



I

2. A pharmaceutical composition suitable for use as an antiphlogistic agent or an analgetic agent comprising the compound of claim 1 as the active ingredient together with a pharmaceutical carrier or diluent.

4,673,667

LIPIDS WITH PLASMIN INHIBITORY PROPERTIES

Nicholas Catsimpoolas, Newton Centre, Mass., assignor to Trustees of Boston University, Boston, Mass.

Filed Oct. 31, 1985, Ser. No. 793,645
Int. Cl.[4] A61K 31/70, 31/715
U.S. Cl. 514—25 6 Claims

1. A method of treating conditions characterized by excess plasmin activity comprising administering an effective amount

of a pharmaceutically acceptable plasmin inhibiting ganglioside to a subject with a condition characterized by excess plasmin activity under conditions favoring inhibition of plasmin activity by said plasmin inhibiting ganglioside containing molecule.

4,673,668

AMINONAPHTHACENE DERIVATIVES

Kikuo Ishizumi, Toyonaka; Naohito Ohashi, Nishinomiya; Norihiko Tanno, Ibaraki; Hiromi Sato; Masaru Fukui, both of Toyonaka, and Shinya Morisada, Takarazuka, all of Japan, assignors to Sumitomo Pharmaceuticals Company, Osaka, Japan

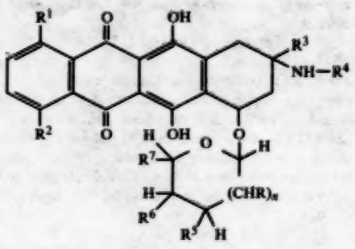
Continuation-in-part of Ser. No. 543,967, Oct. 20, 1983, abandoned. This application Apr. 10, 1985, Ser. No. 721,606

Claims priority, application Japan, Oct. 22, 1982, 57-186514

Int. Cl.[4] A61K *31/71*; C07H *15/24*

U.S. Cl. 514—34 **19 Claims**

1. 9-Aminonaphthacene derivative having the formula:



wherein R^1 and R^2 are both hydrogen atoms or either one of them is a hydrogen atom and the other is hydroxy group or methoxy group; R^3 is acetyl group or 1-hydroxyethyl group; R^4 is a hydrogen atom; R^5 is a hydrogen atom, hydroxy group, lower alkanoyloxy group or amino group; R^6 is a hydrogen atom, hydroxy group or lower alkanoyloxy group; R^7 is a hydrogen atom or methyl group; R is a hydrogen atom; and n is one.

19. A method of inhibiting the growth of P 388 mouse leukemia cells in a mouse comprising administering to a mouse having P 388 mouse leukemia cells an amount of a compound of claim 1 to inhibit the growth of the P 388 mouse leukemia cells sufficiently to increase the life span of the mouse.

4,673,669

PHARMACEUTICAL COMPOSITION CONTAINING A DERIVATIVE OF PARA-AMINOBENZOIC ACID AS AN ACTIVE INGREDIENT

Chikuo Yoshikumi, Kunitachi; Yoshio Ohmura, Funabashi; Fumio Hirose, Tokyo; Masanori Ikuzawa, Tachikawa; Kenichi Matsunaga, Tokyo; Takayoshi Fujii, Tokyo; Minoru Ohhara, Tokyo, and Takao Ando, Tokyo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

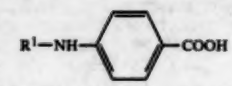
Division of Ser. No. 294,574, Aug. 20, 1981, abandoned, which is a division of Ser. No. 81,190, Oct. 2, 1979, Pat. No. 4,322,408, which is a continuation-in-part of Ser. No. 24,095, Mar. 26, 1979, abandoned. This application Oct. 11, 1985, Ser. No. 786,851

Claims priority, application Japan, Apr. 11, 1978, 53-42576; May 26, 1978, 53-63146; Dec. 29, 1978, 53-161385; Dec. 29, 1978, 53-161386

Int. Cl.[4] A61K *31/70*

U.S. Cl. 514—42 **27 Claims**

1. A method for the treatment of hyperlipemia, which comprises administering to an animal suffering from hyperlipemia an effective amount of a compound of the formula:



wherein R^1 denotes one member selected from the group consisting of the residual groups formed by removing OH at 1(alpha) or 1 (beta) position from arabinose, glucose, galactose and mannose, or a pharmaceutically acceptable salt thereof.

4,673,670

N^6-ACENAPHTHYL ADENOSINES AND ANALOGS THEREOF

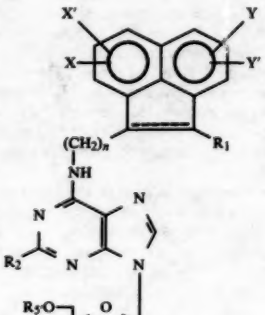
Harriet W. Hamilton; William C. Patt, both of Chelsea, and Bharat K. Trivedi, Canton, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 771,591, Sep. 5, 1985, which is a continuation-in-part of Ser. No. 665,195, Oct. 26, 1984, abandoned. This application Apr. 30, 1986, Ser. No. 857,891

Int. Cl.[4] A61K *31/70*

U.S. Cl. 514—46 **10 Claims**

1. A method of treating angina in a mammal suffering therefrom, which comprises administering to such mammal an anti-angina effective amount of a compound of the formula



wherein:

- - - - is optionally a double or single bond;

n=zero to four;

X, X', Y, Y' are each independently H, OH, halogen, amino, nitro, lower alkyl, trifluoromethyl or lower alkoxy;

R_1 is H, alkyl, OH or lower alkoxy;

R_2 is H or halogen;

R_2', R_3', and R_5' are each independently hydrogen, alkanoyl, benzoyl, benzoyl substituted by lower alkyl, lower alkoxy, halogen or trifluoromethyl; or

R_2' and R_3' together may be 2', 3'-isopropylidene, or a pharmaceutically acceptable acid addition salt thereof.

4,673,671

METHOD FOR IMPROVING THE ABSORPTION AND EFFECTIVENESS OF A CATECHOLAMINE COMPOUND

Cesare Casagrande, Arese Mi, and Francesco Santangelo, Milan, both of Italy, assignors to SIMES Societa Italiana Medicinali e Sintetici S.p.A., Milan, Italy

Filed Jun. 25, 1985, Ser. No. 748,587
Claims priority, application Italy, Jun. 25, 1984, 21583 A/84
Int. Cl.[4] A61K 31/675; C07F 9/12
U.S. Cl. 514—80 20 Claims

1. A method for improving the absorption and therefore effectiveness of a catecholamine compound in a patient exhibiting a syndrome for which the pharmacological action of said cathecholamine compound is useful, comprising converting such catecholamine compound to a mono O-phosphate ester derivative thereof, and administering to the patient an effective amount of the resulting mono O-phosphate ester derivative or of a pharmaceutically acceptable salt thereof.

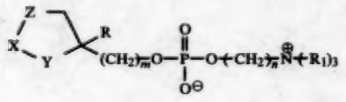
4,673,672

SUBSTITUTED-[HYDROXY(TETRAHYDRO)-5-OXO-(2- AND 3-FURANYL OR 2-THIENYL)ALKOXYPHOSPHINYLOXY]-ALKANAMINIUM HYDROXIDE, INNER SALT OXIDES

William J. Houlihan, Mountain Lakes, and Mark L. Lee, Lake Hopatcong, both of N.J., assignors to Sandoz Pharmaceuticals Corp., E. Hanover, N.J.

Continuation-in-part of Ser. No. 792,095, Oct. 28, 1985, abandoned. This application Jun. 17, 1986, Ser. No. 875,166
Int. Cl.[4] A61K 31/665, 31/67; C07F 9/141
U.S. Cl. 514—95 25 Claims

1. A compound of formula I:



I

where

R is n-C_{14}-C_{18} alkyl; CH_2OR_2, where R_2 is n-C_{14}-C_{18} alkyl; or $CH_2CH_2OR_2$, where R_2 is as defined above;

R_1 is n-C_1-C_3 alkyl;

X is —CH_2—, C=O or —O—;

Y is —CH_2—, —O— or —S—;

Z is —CH_2— or C=O;

m is an integer 1 or 2;

and

n is an integer 2 to 8; with the provisos that: (1) when X is —O—, Y is —CH_2—; and (2) when Y is —O— or —S— and X is —CH_2— or C=O, Z is —CH_2—.

22. A method of treating tumors comprising administering to a subject afflicted therewith a therapeutically effective amount of a compound according to claim 1.

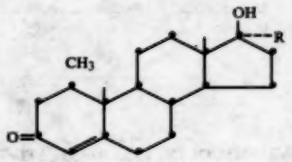
4,673,673

17α-ALKYL-17β-HYDROXY-1α-METHYL-4-ANDROSTEN-3-ONES, THEIR PRODUCTION AND USE PHARMACEUTICALLY

Henry Laurent, and Rudolf Wiechert, both of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Continuation of Ser. No. 661,290, Oct. 17, 1984, abandoned, which is a continuation of Ser. No. 531,785, Sep. 13, 1983, abandoned, which is a continuation of Ser. No. 367,865, Apr. 13, 1982, abandoned. This application Aug. 6, 1985, Ser. No. 762,894
Claims priority, application Fed. Rep. of Germany, Apr. 13, 1981, 3115996
Int. Cl.[4] A61K 31/56; C07J 9/00
U.S. Cl. 514—178 6 Claims

1. A 17α-alkyl-17β-hydroxy-1α-methyl-4-androsten-3-one of the formula



wherein R is n-alkyl of 7 or 8 carbon atoms.

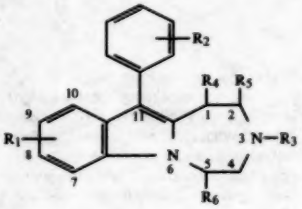
4,673,674

DIAZEPINOINDOLES USEFUL FOR TREATING DEPRESSION, SCHIZOPHRENIA, SOCIAL WITHDRAWAL OR ANXIETY AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Fulvio Gadient, Birsfelden, Switzerland, assignor to Sandoz Pharmaceuticals Corp., E. Hanover, N.J.

Filed Feb. 21, 1985, Ser. No. 704,040
Claims priority, application Switzerland, Feb. 22, 1984, 863/84
Int. Cl.[4] C07D 487/04; A61K 31/40
U.S. Cl. 514—220 9 Claims

1. A. compound of formula I



I

wherein

R_1 and R_2 are each, independently, hydrogen, halogen of atomic number from 9 to 35, (C_1-$_4$)alkyl, (C_1-$_4$)alkoxy or trifluoromethyl,

R_3 is hydrogen, (C_1-$_4$)alkyl, (C_3-$_6$)cycloalkyl, (C_3-$_6$)cycloalkyl-(C_1-$_3$)alkyl, (C_3-$_5$)alkenyl or (C_3-$_5$)alkymyl and

R_4, R_5 and R_6 are each, independently, hydrogen or (C_1-$_4$)alkyl, or a pharmaceutically acceptable acid addition salt thereof.

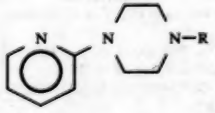
4,673,675

1-(2-PYRIDYL) 4-CYCLOALKYLMETHYL PIPERAZINES HAVING CARDIOTROPIC ACTIVITY

Max F. Robba, and Michel E. Aurousseau, both of Paris, France, assignors to Innothera, France

Filed Sep. 9, 1985, Ser. No. 774,043
Claims priority, application France, Sep. 14, 1984, 84 14089
Int. Cl.[4] A61K 31/495; C07D 401/04, 413/14
U.S. Cl. 514—252 10 Claims

1. A chemical compound having the formula



(I)

and the mineral or organic acid addition salts thereof, wherein R is a cycloalkylmethyl group of 4 to 7 carbon atoms.

10. A method for treating a human or an animal for heart

disease which comprises the step of internally administering thereto a therapeutically effective amount of a compound according to claim 1.

4,673,676

PYRIMIDOISOQUINOLINE DERIVATIVES USEFUL FOR TREATING ALLERGIES

Ikuo Ueda, Uenohigashi; Youichi Shiokawa, Hozumidai, and Takashi Manabe, Kawanishi, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

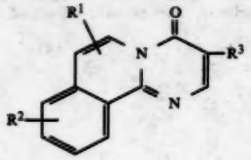
Filed Nov. 9, 1984, Ser. No. 669,865

Claims priority, application United Kingdom, Nov. 23, 1983, 8331228; Mar. 6, 1984, 8405776; Oct. 12, 1984, 8425791

Int. Cl.[4] A61K *31/505;* C07D *487/04*

U.S. Cl. 514—267 10 Claims

1. Pyrimidoisoquinoline derivatives of the formula:



wherein

R^1 is hydrogen, halogen or lower alkyl;

R^2 is amino, nitro, lower alkanoylamino, hydroxy(lower)alkanoylamino, lower alkanoyloxy(lower)alkanoylamino, pyridinecarbonylamino(lower)alkanoylamino, higher alkanoylamino of up to 20 carbon atoms, lower cycloalkylcarbonylamino, lower alkoxycarbonylamino, lower alkoxalylamino, lower alkanesulfonylamino, or phenylcarbamoylamino, and

R^3 is carboxy, lower alkoxycarbonyl, pyridinecarbonylamino(lower)alkoxycarbonyl, N-tetrazolylcarbamoyl or N-[2-(4-diphenylmethylpiperazin-1-yl)ethyl]-carbamoyl

or pharmaceutically acceptable salts thereof.

9. A pharmaceutical composition comprising, as an active ingredient,

(a) an antiallergically effective amount of a pyrimidoisoquinoline of claim 1 or pharmaceutically acceptable salt thereof, and

(b) a pharmaceutically acceptable carrier.

10. A method of treating allergies in a patient subjected to the allergies comprising administering to the patient an antiallergic amount of a pyrimidoisoquinoline of claim 1 or pharmaceutically acceptable salt thereof to effect such treatment.

4,673,677

METHOD FOR TREATMENT OF GASTROINTESTINAL DISORDERS

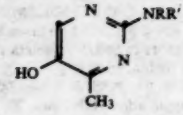
John L. LaMattina, Ledyard, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 538,233, Oct. 3, 1983, Pat. No. 4,554,276. This application Aug. 9, 1985, Ser. No. 764,351

Int. Cl.[4] A61K *31/505;* C07D *239/47*

U.S. Cl. 514—272 3 Claims

1. A method for treatment of gastro-intestinal disorders in a patient, which comprises administering to the patient a gastric anti-secretory effective amount of a substituted pyrimidine having the formula:



(I)

wherein R is hydrogen or $(C_1–C_{15})$alkyl and R′ is hydrogen, $(C_1–C_{15})$alkyl, $(C_5–C_8)$cycloalkyl, $(C_3–C_{15})$alkenyl, phenyl, furyl, thienyl, $(C_7–C_{20})$aralkyl or substituted aralkyl wherein the substitutent is halo, $(C_1–C_3)$alkyl, $(C_1–C_3)$alkoxy or trifluoromethyl; or R and R′ together with the nitrogen atom to which they are attached form a piperidyl group, a substituted piperidyl group wherein the substituent is $(C_1–C_{15})$alkyl or $(C_7–C_{20})$aralkyl, or a pyrrolidinyl group, or a pharmaceutically-acceptable acid addition salt thereof.

4,673,678

WATER SOLUBLE DERIVATIVES OF FREDERICAMYCIN A

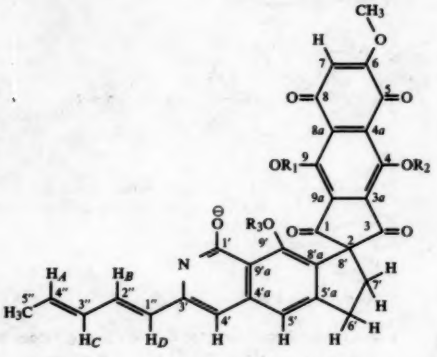
Renuka Misra, Frederick, Md., assignor to The United States of America as represented by the Secretary of the Department of Health and Human Services, Washington, D.C.

Filed Jul. 25, 1986, Ser. No. 889,501

Int. Cl.[4] A61K *31/435;* C07D *221/18;* A01N *43/42*

U.S. Cl. 514—278 8 Claims

1. A compound of the following formula:



wherein at least one of R_1, R_2 and R_3 is an alkali metal moiety, the remaining being either an alkali metal or H.

6. A pharmaceutical composition comprising an effective amount of the compound of claim 1 to inhibit growth of microorganisms or tumors and a pharmaceutically acceptable carrier.

4,673,679

USE OF PRODRUGS OF 3-HYDROXYMORPHINANS TO PREVENT BITTER TASTE UPON BUCCAL, NASAL OR SUBLINGUAL ADMINISTRATION

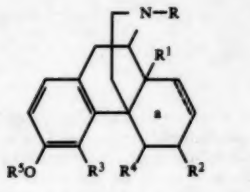
Bruce J. Aungst, and Munir A. Hussain, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

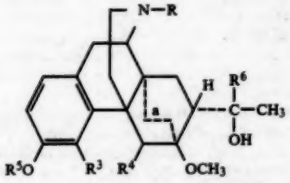
Filed May 14, 1986, Ser. No. 863,045

Int. Cl.[4] A61K *31/44*

U.S. Cl. 514—282 8 Claims

1. A pharmaceutical composition consisting essentially of (i) a therapeutically effective amount of a 3-hydroxymorphinan analgesic, agonist-antagonist, or narcotic antagonist of the formula:





or a pharmaceutically acceptable acid addition salt thereof, wherein:

a is a single bond, or double bond;

R is methyl, allyl, methylallyl, cyclopropylmethyl, or cyclobutylmethyl;

R^1 is H, or OH;

R^2 is H, OH, =O, or $=CH_2$;

R^3 and R^4 are hydrogen, or taken together are ——O——;

R^5 is alkanoyl of 2–18 carbon atoms; alkenoyl of 2–18 carbon atoms; mono- or dialkylcarbamoyl where each alkyl group contains 1–18 carbon atoms; alkylsulfonyl of 1–18 carbon atoms; alkylcarbonates where the alkyl group contains 1–18 carbon atoms; benzoyl, phenylsulfonyl; phenylcarbamoyl; substituted benzoyl; where the benzene ring contains 1–2 substituents individually selected from alkyl of 1–12 carbon atoms, OR^7, NHR^7 and NR^7R^8, Cl, F, Br, I, trifluoromethyl; substituted phenylsulfonyl or phenylcarbamoyl, where the benzene ring contains 1–2 substituents individually selected from alkyl of 1–12 carbon atoms, alkoxy of 1–12 carbon atoms, Cl, F, Br, I, CF_3;

R^6 is t-butyl or n-propyl;

R^7 is H, alkyl of 1–4 carbon atoms or COR^9;

R^8 is alkyl of 1–4 carbon atoms or COR^9; and

R^9 is H, or alkyl of 1–4 carbon atoms;

and (ii) a pharmaceutically acceptable carrier suitable for buccal, nasal, or sublingual administration.

4,673,680

α_2-ADRENERGIC RECEPTOR ANTAGONISTS AS MODIFIERS OF GASTROINTESTINAL MOTILITY

Robert G. Pendleton, 980 Hertford Dr., Hatfield, Pa. 19440

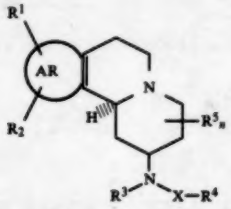
Filed Sep. 18, 1985, Ser. No. 777,472

Int. Cl.[4] A61K *31/44, 31/55, 31/505*

U.S. Cl. 514—285 **5 Claims**

1. A method of treating colonic spasm, irritable bowel syndrome and constipation which comprises adminstering to a patient in need of such treatment an effective amount of a selective α_2-adrenergic receptor antagonist of structural formula:

(I)



(II)

or a pharmaceutically acceptable salt thereof wherein Ar represents an aromatic heterocycle selected from R^1,R^2-benzo[b]furo-, or R^1,R^2-benzo[b]thieno-, R^1 and R^2 are independently:

(1) hydrogen,

(2) halo,

(3) hydroxy,

(4) C_{1-3}alkoxy, or

(5) C_{1-6}alkyl;

R^3 is

(1) hydrogen,

(2)

wherein R is hydrogen or C_{1-3}alkyl,

(3) C_{1-6}alkyl, either unsubstituted or substituted with one or more of;

(a) hydroxy,

(b) carboxy,

(c) C_{1-3}alkoxycarbonyl,

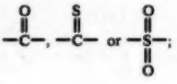
(d) halo,

(e) C_{1-3}alkoxy,

(f) $—CONR^6R^7$, wherein R^6 and R^7 are the same or different and are hydrogen or C_{1-5}alkyl, or joined together directly to form a 5–7 membered ring or through a heteroatom selected from O, N and S, to form a 6-membered heterocycle with the nitrogen to which they are attached, or

(g) $—NR^6R^7$;

X is



and

R^4 is

(1) $—OR^8$, wherein R^8 is hydrogen or C_{1-6} alkyl, either unsubstituted or substituted with one or more of;

(a) OR, or

(b) —NRCOR;

(2) $—N(R^8)_2$,

(3) $—CO_2R^8$,

(4) $—CONR^6R^7$,

(5) C_{1-6} alkyl, either unsubstituted or substituted with

(a) OR^8,

(b) halo,

(c) CO_2R^8,

(d) $CONR^6R^7$,

(6) C_{2-5}alkenyl,

(7) C_{2-5}alkynyl,

(8) C_{3-6}cycloalkyl,

(9) 5 or 6-membered heterocycle with up to 2 heteroatoms selected from N, O, and S,

(10) carbocyclic aryl of 6–10 carbon atoms, either unsubstituted or substituted with one or more of;

(a) halo, or
(b) OR; or
R^5 is independently
(1) C_{1-6} alkyl, either unsubstituted or substituted with one or more of
(a) $—OR^8$,
(b) $—NR^8COR^8$, or
(c) $—CO_2R^8$,
(2) $—CO_2R^8$, or
(3) $—CONR^6R^7$;
n is 0, 1, 2 or 3; and
R^3 and R^4 taken together directly or through a heteroatom selected from O, N and S, to form a 5- or 6-membered heterocycle with the nitrogen to which they are attached; or
R^3 and R^5 or R^4 and R^5, if R^5 is in the 1- or 3-position and both are alkyl, can be joined together to form a 5- or 6-membered ring.

4,673,681
PHARMACEUTICAL METHODS HAVING DOPAMINERGIC ACTIVITY

Stefano Poli, Milan, Italy, assignor to Poli Industria Chimica S.p.A., Milan, Italy

Filed Apr. 2, 1986, Ser. No. 847,395
Claims priority, application Italy, Apr. 4, 1985, 20234 A/85
Int. Cl.[4] A61K *31/44*
U.S. Cl. 514—288 **4 Claims**

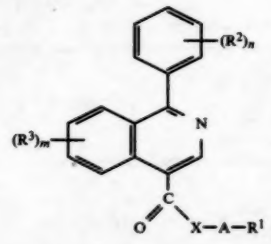
1. A method for the treatment of a person with Parkinson's disease, cephalalgias or depression, comprising the step of:
administering an effective dosage of dihydroergocryptine, or a salt thereof, in combination with a pharmaceutically acceptable carrier means to said person.

4,673,682
ISOQUINOLINE DERIVATIVES, PHARMACEUTICAL FORMULATIONS BASED ON THESE COMPOUNDS AND THE USE THEREOF

Elmar Konz, Kelkheim, and Joachim Kaiser, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Sep. 7, 1983, Ser. No. 530,000
Claims priority, application Fed. Rep. of Germany, Sep. 9, 1982, 3233424
Int. Cl.[4] A61K *31/47*; C07D *217/16*
U.S. Cl. 514—307 **10 Claims**

1. An isoquinoline-4-carboxylic acid derivative of the formula I



I

in which m and n denote one or two,
X denotes oxygen or nitrogen which is substituted by hydrogen or C_1–C_6-alkyl,
A denotes a bond or a linear or branched C_1–C_8-alkylene chain,
R^1 either denotes an amino group of the formula

in which R^4 and R^5 are identical or different and denote hydrogen or linear or branched C_1–C_8-alkyl radicals, or
R^1 denotes a 3-membered to 6-membered ring which has a nitrogen atom in the ring and in which the nitrogen atom is unsubstituted or substituted by hydrogen or C_1–C_8-alkyl and in which one $—CH_2—$ group can be replaced by oxygen, sulfur or the —NH— or —N—C_1–C_8-alkyl group, subject to the proviso that the hetero-atoms in the side chain ($—X—A—R^1$) are separated by at least 2 carbon atoms,
R^2 denotes hydrogen, fluorine, chlorine, bromine, hydroxyl, nitro, amino, C_1–C_6-alkyl or C_1–C_6-alkoxy radicals, and
R^3 denotes hydrogen, fluorine, chlorine, bromine, hydroxyl, nitro, amino, C_1–C_6-alkyl or C_1–C_6-alkoxy radicals or a benzyloxy, methylenedioxy or ethylenedioxy group,
or a physiologically acceptable acid addition salt thereof.

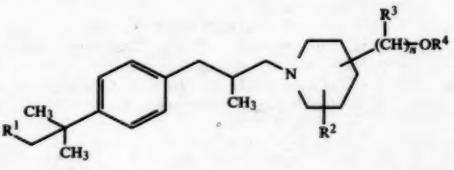
5. A method of treating a host having arrythmias which comprises administering to said host a pharmaceutically effective dosage of a compound as claimed in claim 1.

4,673,683
FUNGICIDAL PIPERIDINE DERIVATIVES

Ernst Buschmann, Ludwigshafen; Ludwig Schuster, Limburgerhof; Norbert Goetz, Worms; Ernst-Heinrich Pommer, Limburgerhof, and Eberhard Ammermann, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 5, 1985, Ser. No. 772,714
Claims priority, application Fed. Rep. of Germany, Sep. 8, 1984, 3433036
Int. Cl.[4] A01N *43/40*; C07D *211/22, 211/46*
U.S. Cl. 514—317 **3 Claims**

3. A process for combatting fungi, wherein a fungicidally effective amount of a piperidine of the formula



where
R^1 is hydrogen, C_1–C_6-alkyl or halogen,
R^2 and R^3 are hydrogen or C_1–C_6-alkyl,
R^4 is hydrogen, C_1–C_6-alkyl, allyl, propargyl, trichloroallyl, benzyl, halobenzyl, C_1–C_4-alkylbenzyl, trifluoromethylbenzyl, alpha-naphthyl methyl or betanaphthyl methyl COR^5, CO_2R^6 or $CONR^7R^8$,
R^5 and R^6 are C_1–C_4-alkyl, unsubstituted phenyl or halo- or C_1–C_4-alkyl substituted phenyl or unsubstituted or halo-substituted benzyl
R^7 and R^8 are hydrogen, C_1–C_4-alkyl, phenyl, halophenyl, benzyl or halobenzyl and
n is 0, 1, 2 or 3,
or a plant-tolerated acid addition salt thereof, with the proviso that, when R^4 is hydrogen, acetyl or propionyl, n is not 0 or 1 and R^1, R^2 and R^3 are not hydrogen, and with the further proviso that when n is 2, R^4 is not hydrogen, and with the further proviso that when n is 0, R^2 is not hydrogen or methyl is allowed to act on materials, areas, plants or seed threatened by fungi or fungal attack.

4,673,684

AMIDE DERIVATIVES AND 5-LIPOXYGENASE INHIBITORS CONTAINING THE SAME AS AN ACTIVE INGREDIENT

Toshio Wakabayashi; Makoto Takai; Shuji Ichikawa; Jun-ichiro Arai, and Seiitsu Murota, all of Tokyo, Japan, assignors to Terumo Corporation, Tokyo, Japan

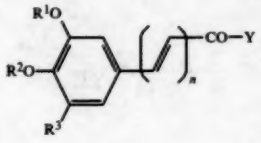
Filed Apr. 2, 1985, Ser. No. 719,131

Claims priority, application Japan, Apr. 4, 1984, 59-67286; Jul. 6, 1984, 59-141175; Jul. 6, 1984, 59-141176; Sep. 25, 1984, 59-200297; Oct. 31, 1984, 59-229105; Nov. 20, 1984, 59-245695

Int. Cl.[4] A61K *31/445*; C07D *211/46, 405/12*

U.S. Cl. 514—327 9 Claims

1. An amide derivative having the formula



wherein

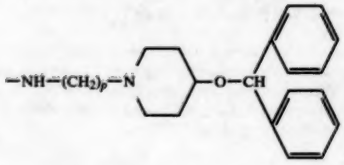
R^1 represents hydrogen or lower alkyl,

R^2 represents hydrogen, lower alkyl or toluoyloxy, or R^1 and R^2 taken together represent a lower alkylene group,

R^3 represents hydrogen or lower alkoxy,, R^2 and R^3 both being hydrogen when R^1 is hydrogen,

n is an integer of 1 or 2, and

Y represents



wherein p is an integer from 2 to 4.

5. A method for inhibiting 5-lipoxygenase activity in a mammal comprising administering to said mammal an effective amount of the amide derivative of claim 1.

4,673,685

HYDROXIMIC ACIDS OF 7-OXABICYCLOHEPTANE SUBSTITUTED ETHERS AND THIOETHERS USEFUL IN THE TREATMENT OF THROMBOTIC DISEASE

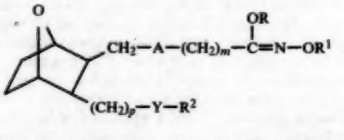
Ravi K. Varma, Belle Mead; Eric M. Gordon, Pennington, and Ligaya M. Simpkins, Allentown, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Jul. 23, 1986, Ser. No. 888,671

Int. Cl.[4] A61K *31/34, 31/557*; C07D *307/00*

U.S. Cl. 514—333 24 Claims

1. A compound of the structure



including all stereoisomers thereof, wherein A is —CH=CH— or —$(CH_2)_2$—; m is 0 to 10; R is lower alkyl, aryl, aralkyl or lower alkenyl containing 2 to 12 carbons; R^1 is H, lower alkyl, aryl, aralkyl, lower alkenyl containing 2 to 12 carbons, cycoalkyl, alkanoyl or aroyl; p is 1 to 5; Y is O or

wherein q is 0, 1 or 2; and R^2 is lower alkyl, aryl, arylalkyl, cycloalkyl, cycloalkylalkyl, lower alkenyl containing 2 to 12 carbons or lower alkynyl containing 2 to 12 carbons, or a pharmaceutically acceptable salt thereof, wherein lower alkyl or alkyl alone or as part of another group contains 1 to 12 carbons and is unsubstituted or is substituted with halo, CF_3, alkoxy, aryl, 2-, 3-, or 4-pyridyl, alkyl-aryl, haloaryl, cycloalkyl, or alkylcycloalkyl;

aryl alone or as part of another group represents phenyl or naphthyl and is unsubstituted or is substituted with 1 or 2 lower alkyl groups, 1 or 2 halogens, 1 or 2 hydroxy groups and/or 1 or 2 lower alkoxy groups;

cycloalkyl alone or as part of another group contains 3 to 12 carbons and is unsubstituted or is substituted with 1 or 2 halogens, 1 or 2 lower alkyl groups and/or 1 or 2 lower alkoxy groups;

$(CH_2)_m$ and $(CH_2)_p$ may contain 1 or 2 lower alkyl and/or 1 or 2 halo substituents.

21. A method of inhibiting Δ^5-lipoxygenase which comprises administering to the circulatory system of a mammalian host an effective amount of a compound as defined in claim 1 or a pharmaceutically acceptable salt thereof.

4,673,686

NEW SUBSTITUTED HETEROCYCLIC BENZAMIDES, METHODS OF PREPARING THEM AND THEIR APPLICATION AS BEHAVIOR MODIFIERS

Michel Thominet, Paris; Jacques Acher, Itteville, and Jean-Claude Monier, Lardy, all of France, assignors to Societe d'Etudes Scientifiques et Industrielle de l'Ile de France, Paris, France

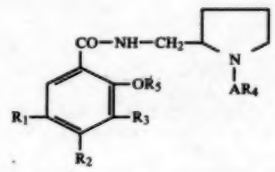
Continuation of Ser. No. 620,005, Jun. 12, 1984, abandoned, which is a division of Ser. No. 395,994, Jul. 7, 1982, abandoned, which is a continuation of Ser. No. 505,191, Jan. 22, 1979, abandoned. This application Aug. 26, 1985, Ser. No. 769,796

Claims priority, application France, Jan. 20, 1978, 78 10633; Nov. 7, 1978, 78 31458

Int. Cl.[4] A61K *31/41, 31/40*; C07D *249/18, 207/09*

U.S. Cl. 514—359 7 Claims

1. Substituted heterocyclic benzamides, their salts of addition with pharmacologically acceptable acids, their quaternary ammonium salts, their N-oxides and their optically active isomers, of formula (I):



(I)

wherein:

A is a single bond

R_4 is a norbornyl or adamantyl group

R_5 is a C_{1-3} alkyl group

R_1 is a sulfamoyl group or a, C_{1-3} alkylsulfonyl group

R_2 is a hydrogen or halogen atom, an amino group or is joined with R_1 to form an azimido group

R_3 is a hydrogen atom.

6. A process for the treatment of nausea in patients which comprises administering an effective amount of the substituted heterocyclic benzamide of claim 1 or 2 and a pharmaceutically acceptable carrier.

4,673,687

NEW CHEMOTHERAPEUTIC AGENTS FOR THE CONTROL OF PLANT AND ANIMAL DISEASES

Mandayam J. Thirumalachar; Mandayam J. Narasimhan, and Mandayam J. K. Thirumalachar, all of Bangalore, India, assignors to Source Technology Biologicals, Inc., Minneapolis, Minn.

Division of Ser. No. 487,842, Apr. 22, 1983, Pat. No. 4,544,666. This application Sep. 5, 1985, Ser. No. 758,322

Int. Cl.[4] C07C *1/08;* H01N *37/10*

U.S. Cl. 514—460 8 Claims

1. As a new chemotherapeutic agent, the tannate complex of picro cupric ammonium formate in aqueous solution wherein cupric ammonium formate is comprised of one mole of a water soluble cupric salt reacted with 2 to 2.9 moles of ammonium formate, and for each 100 parts by dry weight of cupric ammonium formate said complex includes from about 2 to 5 parts by weight of picric acid and about 0.5 to 3.5 parts by weight of tannic acid combined with about 2 to 10 parts by weight of surfactant sufficient to prevent separation of the tannate complex.

4,673,688

PARTIAL AMINE SALTS OF EDTA AS BLOOD ANTICOAGULANT

Yoshio Murashige, Iwakuni; Akira Yanagase; Yasunori Kawachi, both of Ohtake, and Junko Soga, Hiroshima, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 839,028, Mar. 12, 1986, abandoned, which is a continuation-in-part of Ser. No. 775,358, Sep. 12, 1985, abandoned. This application Oct. 2, 1986, Ser. No. 914,512

Claims priority, application Japan, Mar. 28, 1985, 60-64612

Int. Cl.[4] A61K *31/195;* C07C *101/26*

U.S. Cl. 514—554 14 Claims

1. A method for preventing the coagulation of blood, comprising:

contacting blood with an effective amount of an anticoagulant comprising a salt formed by reacting ethylenediaminetetraacetic acid with an alkylenediamine having 2 to 8 carbon atoms in a molar ratio of ethylenediaminetetraacetic acid to ethylenediamine ranging from 1.0:0.5 to 1.0:2.0, or with an alkylamine having 1 to 8 carbon atoms in a molar ratio of ethylenediaminetetracetic acid to alkylamine ranging from 1.0:1.0 to 1.0:3.0.

4,673,689

METHOD AND COMPOSITION FOR ENHANCING THE EFFECT OF INDIRECT-ACTING SYMPATHOMIMETIC AMINES

Richard J. Wurtman, Boston, and Timothy J. Maher, Milton, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Division of Ser. No. 780,054, Sep. 25, 1985, Pat. No. 4,598,094. This application Mar. 27, 1986, Ser. No. 845,141

Int. Cl.[4] A61K *31/195*

U.S. Cl. 514—561 2 Claims

1. The process for preventing tachyphylaxis of phenylpropanolamine which comprises administering to a patient concomitantly with said phenylpropanolamine a catecholamine precursor selected from the group consisting of tyrosine, a tyrosine precursor or a mixture of tyrosine and a tyrosine precursor to obtain a tyrosine blood plasma concentration between about 15 and 100 μg/ml.

4,673,690

ACYLATED ENAMIDES AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Marcel B. Roberfroid, Louvain-La-Neuve; Heinz G. Viehe, Limal, and Francoise M. Hervens, Sint-Agatha-Rode, all of Belgium, assignors to Biotec, Belgium

PCT No. PCT/BE83/00022, § 371 Date Aug. 23, 1984, § 102(e) Date Aug. 23, 1984, PCT Pub. No. WO84/02523, PCT Pub. Date Jul. 5, 1984

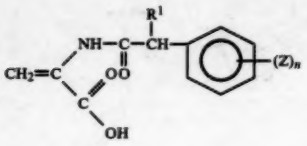
PCT Filed Dec. 20, 1983, Ser. No. 644,719

Claims priority, application France, Dec. 27, 1982, 82 21965

Int. Cl.[4] A61K *31/195*

U.S. Cl. 514—563 11 Claims

1. Acylated enamide compounds, characterised in that they are compounds corresponding to the general formula



in which

Z represents an electron donor group selected from the electron donor groups comprising a halogen or a chemical group selected from the groups comprising OR^2, SR^2, SeR^2, $N{=}R^2$ or NR^2R^3, in which the oxygen (O), sulphur (S), selenium (Se) and nitrogen (N) can form part of a ring and R^2 and R^3 can be identical or different and represent hydrogen or a saturated or unsaturated aliphatic or cyclic organic group containing 1 to 20 carbon atoms;

n is 1, 2 or 3; and

R^1 represents hydrogen, a halogen, a substituted or unsubstituted aliphatic group containing from 1 to 4 carbon atoms or an aromatic group containing from 5 to 8 carbon atoms;

or salts, complexes, alkylated derivatives or acylated derivatives of these compounds.

4,673,691

HUMAN WEIGHT LOSS INDUCING METHOD

Nicholas Bachynsky, 1110 Pine Cir., Sea Brook, Tex. 77586, assignor to Nicholas Bachynsky, Sea Brook, Tex.

Filed Nov. 5, 1984, Ser. No. 668,501

Int. Cl.[4] A61K *31/195*

U.S. Cl. 514—567 8 Claims

1. A method of inducing weight loss in a patient, comprising the steps of:

(a) administering 2,4-dinitrophenol or salt thereof at a rate ranging from about 60 to about 250 mg/day; and

(b) concurrently administering 3,5,3'-triiodothyronine to the patient at a rate ranging from about 25 to about 100 mcg/day.

4,673,692

DIPHENYLMETHYLIMINE DERIVATIVES, THEIR COMPOSITIONS AND PHARMACEUTICAL USES

Yasushi Suzuki, Yokohama; Yukio Hasegawa, Yamato; Michitaka Sato, Kawasaki; Morinobu Saito, Kawasaki; Norio Yamamoto, Kawasaki; Katsuhiko Miyasaka, Atsugi; Takashi Mikami, Yokohama, and Katsuhiko Miyazawa, Kawasaki, all of Japan, assignors to Teikoku Hormone Mfg. Co., Ltd., Tokyo, Japan

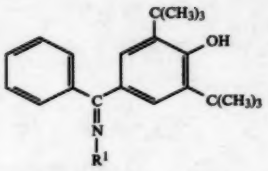
Filed Oct. 18, 1985, Ser. No. 789,275

Claims priority, application Japan, Oct. 19, 1984, 59-218679

Int. Cl.[4] A61K *31/175, 31/15;* C07C *131/00*

U.S. Cl. 514—583 7 Claims

1. A compound represented by the formula



(I)

wherein R^1 represents a hydroxyl group, an alkanoyloxy group or a group of the formula

in which R^2 represents a hydrogen atom or a lower alkyl group, and R^3 represents a hydrogen atom, a lower alkyl group, an alkanoyl group, a phenyl group, a carbamoyl group or a thiocarbamoyl group, or a salt thereof.

4. An anti-inflammatory, analgesic or anti-rheumatic composition comprising an effective amount for the purpose intended of a compound of claim 1 or its pharmaceutically acceptable salt and a pharmaceutically acceptable carrier or diluent.

4,673,693

PROCESS FOR PREPARING OXYGEN-CONTAINING ORGANIC COMPOUNDS

Soichi Uchiyama; Toshiaki Hayasaka, and Yasuo Ohbayashi, all of Sodegaura, Japan, assignors to Research Association for Petroleum Alternatives Development, Tokyo, Japan

Filed Oct. 23, 1985, Ser. No. 790,416

Claims priority, application Japan, Nov. 5, 1984, 59-231295

Int. Cl.[4] C07C *27/06*

U.S. Cl. 518—713 **5 Claims**

1. A process for preparing alcohols from hydrogen and carbon monoxide and increasing the selectivity of alcohol having at least two carbon atoms which comprises contacting the hydrogen and carbon monoxide with a solid catalyst prepared by the steps of: mixing (A) a copper compound, (B) a nickel compound and (C) a zinc compound; calcining the mixture to obtain a calcined product; mixing (D) a potassium compound with the calcined product; and then reducing the resulting mixture, wherein the mole ratio of the compounds (A), (B), (C) and (D), calculated as oxides, is

(A) 0.05 to 0.5,

(B) 0.01 to 0.55,

(C) 0.1 to 0.7, and

(D) 0.005 to 0.16, and recovering the mixture of alcohols thusly produced.

4,673,694

HIGHER MOLECULAR WEIGHT THERMOPLASTICS HAVING MULTIMODAL MOLECULAR WEIGHT DISTRIBUTION

Bernard H. Meyer, Newtown Square; Adolph V. DiGiulio, Wayne; Joseph C. Kinslow, and Dennis M. Hajnik, both of West Chester, all of Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Division of Ser. No. 861,796, May 12, 1986. This application Oct. 3, 1986, Ser. No. 914,893

Int. Cl.[4] C08J *9/18*

U.S. Cl. 521—59 **10 Claims**

1. A thermoplastic polymer particle comprising a base styrene polymer of low molecular weight having at least 10% by weight of a high molecular weight thermoplastic resin from a monoethylenically unsaturated monomer or monomers, said monomer or monomers being polymerized throughout or near or at the surface such that the molecular weight distribution of the particle is bimodal or multimodal.

4,673,695

LOW DENSITY MICROCELLULAR FOAMS

James H. Aubert; Roger L. Clough, both of Albuquerque; John G. Curro, Placitas; Carlos A. Quintana; Edward M. Russick, both of Albuquerque, all of N. Mex., and Montgomery T. Shaw, Mansfield Center, Conn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 8, 1985, Ser. No. 785,436

Int. Cl.[4] C08U *9/26; C08V *9/28*

U.S. Cl. 521—64 **16 Claims**

1. In a process for preparing a microporous, low-density foam having a nominal cell size of from about 1-20 micrometers and a density of less than about 0.1 g/cc comprising the steps of:

forming a homogeneous initial solution of a polymer in a solvent therefor at a temperature at which said polymer is essentially completely soluble in said solvent,

cooling said solution at a rate such that said solution forms a phase-separated system comprising two distinct phases, each of which is continuous within the other and wherein one phase comprises essentially said polymer and the other phase comprises essentially said solvent and wherein the morphology of said polymer phase determines the morphology of the resultant foam,

continuing said cooling at said rate such that said system retains essentially the same morphology it possessed at the point of phase separation and until said system is substantially entirely frozen, and

removing said solvent to produce a foam,

the improvement comprising placing said initial solution in a chamber capable of subjecting it to essentially one-dimensional cooling, and

carrying out said cooling in one-dimensional fashion which comprises cooling the solvent system from essentially one direction so that the solution is subjected to cooling on only one side, as opposed to two or more sides, and means are provided to insulate the solution from heat transfer from any direction except the intended one.

4,673,696

THERMOSET MOLDING COMPOSITIONS

Chung-Chieh Tsai, Dublin, Ohio, assignor to Ashland Oil, Inc., Russell, Ky.

Filed Jul. 3, 1986, Ser. No. 881,640

Int. Cl.[4] C08G *18/14*

U.S. Cl. 521—172 **35 Claims**

1. A method for making a storage stable blend of a long chain polyol and a short chain diol which blend phase separates under storage, which comprises:

incorporating into said blend a stabilizing amount of an ethylenically unsaturated esterol.

4,673,697

INSULATION MATERIAL AND ITS PREPARATION

Frederick Rowley, Astley, Nr. Shrewsbury, England, assignor to Shell Internationale Research Maatschappij B.V., Netherlands

Filed Jul. 17, 1986, Ser. No. 886,312

Claims priority, application United Kingdom, Aug. 5, 1985, 8519654

Int. Cl.[4] C08J *9/32*

U.S. Cl. 523—218 **6 Claims**

1. An insulation material in the form of a cured composition comprising as components:

(a) 10 to 30%w magnesium chloride,

(b) 0 to 15%w of an organic resin,

(c) 0 to 0.5%w of a mould-release agent,

(d) 0.1 to 1%w of a surfactant,

(e) 6 to 8%w of a sodium polyphosphate glass,
(f) 6 to 20%w magnesium oxide,
(g) 4 to 20%w inorganic filler,
(h) 15 to 30%w cenospheres,
(i) 1 to 3%w orthosphosphoric acid,
(j) 0 to 12 %w inorganic fibres,
in overall proportions to total 100%, having a density in the range 200 to 500 kg/m^3.

4,673,698

FAST SETTING STARCH-BASED CORRUGATING ADHESIVE HAVING PARTIALLY HYDROLIZED WATER SOLUBLE POLYVINYL ALCOHOL COMPONENT

Paul L. Krankkala, Woodbury, Minn., assignor to H. B. Fuller Company, St. Paul, Minn.

Division of Ser. No. 751,462, Jul. 2, 1985, Pat. No. 4,600,739, which is a continuation of Ser. No. 612,359, May 21, 1984, abandoned. This application Jan. 21, 1986, Ser. No. 820,669
Int. Cl.[4] C08L *3/02, 5/16, 29/04*
U.S. Cl. 524—47 **10 Claims**

1. A dry blend composition, that can be diluted with water to form an adhesive, a major proportion of a starch composition useful in corrugating adhesives, and an effective amount of a cold water soluble partially hydrolyzed polyvinyl alcohol composition that can increase the rate of formation of a green bond during corrugated board manufacture.

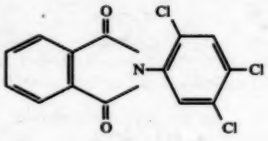
4,673,699

FLAME RETARDANT MOLDING COMPOSITIONS

Sivaram Krishnan, Pittsburgh, Pa., and Ulrich R. Grigo, Kempen, Fed. Rep. of Germany, assignors to Mobay Corporation, Pittsburgh, Pa.

Filed Nov. 19, 1984, Ser. No. 672,511
Int. Cl.[4] C08K *5/34*
U.S. Cl. 524—94 **2 Claims**

1. A thermoplastic molding composition comprising an aromatic polycarbonate resin and an imide compound which is characterized in that its melt temperature is below 300° C. and conforms to



said molding composition rating at least V-0 for ⅛" specimens in accordance with UL-94 flame retardance test.

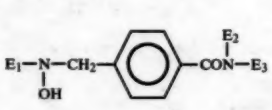
4,673,700

AMIDE SUBSTITUTED BENZYLHYDROXYLAMINES AND STABILIZED POLYOLEFIN COMPOSITIONS

Ramanathan Ravichandran, Yonkers, and Thomas E. Snead, Croton-on-Hudson, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

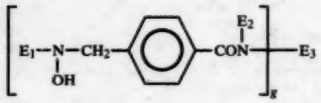
Filed Nov. 21, 1985, Ser. No. 800,627
Int. Cl.[4] C07D *295/18, 251/24;* **C07C** *103/78, 121/78;* **C08K** *5/34, 5/32*
U.S. Cl. 524—96 **29 Claims**

1. A compound of the formula



wherein
E_1 is alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, aralkyl of 7 to 9 carbon atoms or said aralkyl substituted by alkyl of 1 to 36 carbon atoms or by $—CON(E_2)(E_3)$, and
E_2 and E_3 are independently hydrogen or alkyl of 1 to 18 carbon atoms.

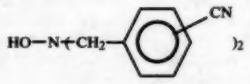
4. A compound of formula I



(I)

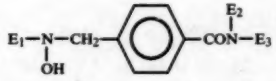
wherein
g is 2 or 3;
E_1 is alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, aralkyl of 7 to 9 carbon atoms or said aralkyl substituted by alkyl of 1 to 36 carbon atoms,
when g is 2,
E_2 is hydrogen, alkyl of 1 to 18 carbon atoms, cycloalkyl of 5 to 7 carbon atoms, aryl of 6 to 10 carbon atoms, aralkyl of 7 to 9 carbon atoms, or said aryl or said aralkyl substituted by alkyl of 1 to 36 carbon atoms, and
E_3 is alkylene of 2 to 12 carbon atoms or arylene of 6 to 10 carbon atoms, or
E_2 and E_3 together with the N-atoms to which they are attached are piperazino, and
when g is 3,
E_2 and E_3 together with the N-atoms to which they are attached are hexahydro-1,3,5-triazino.

5. A compound of the formula



where the cyano is in the ortho-, meta- or para-position relative to the $—CH_2—$ moiety.

7. A composition, stabilized against degradation, which comprises
(a) a saturated polyolefin or mixture thereof,
(b) a stabilizing amount of a stabilizer or mixture of stabilizers selected from the group consisting of the phenolic antioxidants, the hindered amine light stabilizers, the alkylated hydroxybenzoate light stabilizers, the ultraviolet light absorbers, the organic phosphorus compounds, the alkaline metal salts of fatty acids and the thiosynergists, and
(c) a stabilizing amount of a compound of the formula

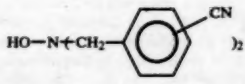


wherein
E_1 is alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, aralkyl of 7 to 9 carbon atoms or said aralkyl substituted by alkyl of 1 to 36 carbon atoms or by $—CON(E_2)(E_3)$, and
E_2 and E_3 are independently hydrogen or alkyl of 1 to 18 carbon atoms.

19. A composition, stabilized against degradation, which comprises
(a) a saturated polyolefin or mixture thereof,
(b) a stabilizing amount of a stabilizer or mixture of stabilizers selected from the group consisting of the phenolic antioxidants, the hindered amine light stabilizers, the alkylated hydroxybenzoate light stabilizers, the ultraviolet

light absorbers, the organic phosphorus compounds, the alkaline metal salts of fatty acids and the thiosynergists, and

(c) a stabilizing amount of a compound of the formula



where the cyano is in the ortho-, meta- or para-position relative to the —CH_2— moiety.

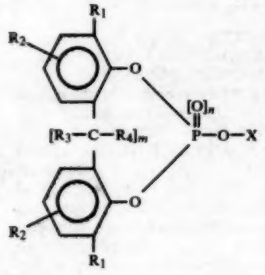
4,673,701

ALKYLIDENE BISPHENOL PHOSPHITES AND PHOSPHATES HAVING 2,2,6,6-TETRAMETHYL PIPERIDINYL GROUPS AND SYNTHETIC RESIN COMPOSITION

Motonobu Minagawa, Koshigaya; Yutaka Nakahara, Iwatsuki; Toshihiro Shibata, Omiya, and Ryozo Arata, Kyoto, all of Japan, assignors to Adeka Argus Chemical Co., Ltd., Urawa, Japan

Filed Dec. 28, 1984, Ser. No. 687,090
Claims priority, application Japan, Dec. 29, 1983, 58-249828
Int. Cl.[4] C08K *5/34*
U.S. Cl. 524—99 **36 Claims**

1. Alkylidene bisphenol phosphites and phosphates having 2,2,6,6-tetramethyl piperidinyl groups having the formula:



I

wherein:

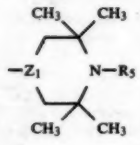
R_1 is alkyl having from one to about twelve carbon atoms;

R_2, R_3 and R_4 are each selected from the group consisting of hydrogen and alkyl having from one to about twelve carbon atoms;

m is 0 or 1;

n is 0 or 1;

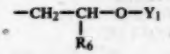
X is selected from the group consisting of



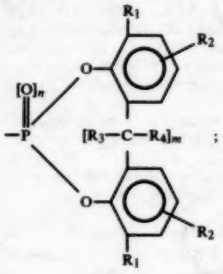
(1)

wherein:

R_5 is selected from the group consisting of hydrogen, oxyl O, alkyl having from one to about twelve carbon atoms; aryl alkyl having from seven to about eighteen carbon atoms; 2,3-epoxypropyl, acyl having from one to about eight carbon atoms and

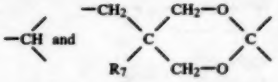


in which R_6 is selected from the group consisting of hydrogen, alkyl having from one to about twelve carbon atoms and phenyl, and Y_1 is selected from the group consisting of hydrogen; acyl having from one to about twelve carbon atoms; and



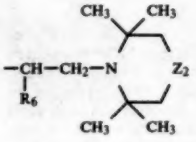
;

Z_1 is selected from the group consisting of



wherein R_7 is alkyl having from one to about twelve carbon atoms;

and

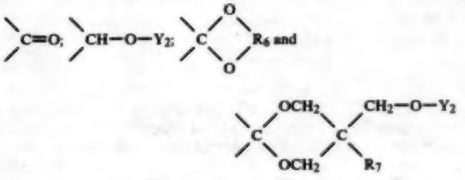


(2)

wherein:

R_6 is selected from the group consisting of hydrogen, alkyl having from one to about twelve carbon atoms and phenyl; and

Z_2 is selected from the group consisting of



in which R_7 is alkyl having from one to about twelve carbon atoms; R_8 is alkylene having from one to about eight carbon atoms and Y_2 is selected from the group consisting of hydrogen and acyl having from one to about eight carbon atoms.

4,673,702

STABLE EMULSIONS OF WATER RESISTANT POLYVINYL ALCOHOL-STABILIZED VINYL CHLORIDE-ETHYLENE COPOLYMERS

John G. Iacoviello, Allentown, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation-in-part of Ser. No. 572,726, Jan. 20, 1984, abandoned. This application Jun. 20, 1985, Ser. No. 747,133

Int. Cl.[4] C08F *2/16*; C08K *3/20*

U.S. Cl. 524—459 16 Claims

1. A method for preparing a stable polyvinyl alcohol/vinyl chloride-ethylene copolymer emulsion which comprises a copolymer colloidally dispersed in an aqueous medium, the copolymer having a Tg from 0° to 50° C., consisting of ethylene and about 65 to 90 wt% vinyl chloride and prepared by emulsion polymerization of the monomers in the presence of an emulsifying system consisting essentially of about 3 to 15 wt% polyvinyl alcohol which is 70 to 91 mole% hydrolyzed, which method comprises

(a) forming an aqueous emulsion reaction mixture containing substantially all the polyvinyl alcohol and a portion of the total vinyl chloride monomer,

(b) pressurizing the reaction mixture with an ethylene pressure sufficient to provide the copolymer with the desired ethylene content,

(c) initiating the reaction mixture by the addition of a free radical generating source and continuing polymerization until the rate of polymerization begins to decrease,

(d) adding the remaining vinyl chloride over a period of time while continuing polymerization until the reaction is no longer self-sustaining, and

(e) removing the unreacted ethylene and reducing the vinyl chloride free monomer content of the emulsion.

4,673,703

COATING COMPOSITIONS

Charles W. A. Bromley, Bourne End, and Jonathan A. Graystone, Maidenhead, both of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Jul. 23, 1985, Ser. No. 758,205

Claims priority, application United Kingdom, Aug. 6, 1984, 8420005

Int. Cl.[4] C08L *51/00*

U.S. Cl. 524—504 14 Claims

1. A coating composition in which at least 51% by weight of the film-forming material is present as a sterically stabilised dispersion in a volatile organic liquid of particles having an average diameter in the range 0.1–10 μm of an acrylic or vinyl polymer which is insoluble in that liquid, the polymer having an extensibility as determined by the procedure of A.S.T.M. D2370-68 in the range 50–2000% and being crosslinked to an extent such that the disperse phase has a gel content of at least 35% by weight, and the crosslinking of the polymer is achieved by the inclusion in the monomers which are polymerised to form the polymer either of a difunctional or polyfunctional monomer selected from allyl methacrylate, trimethylolpropane triacrylate, diallyl phthalate and the diacrylate of bisphenol-A, or of a pair of monomers which are mutually coreactive, and are glycidyl acrylate or methacrylate and acrylic or methacrylic acid.

4,673,704

AQUEOUS POLYMER DISPERSIONS

Peter Flesher, and David Farrar, both of West Yorkshire, United Kingdom, assignors to Allied Colloids Limited, United Kingdom

Filed Jun. 27, 1985, Ser. No. 749,295

Claims priority, application United Kingdom, Jun. 28, 1984, 8416453

Int. Cl.[4] C08L *1/02*

U.S. Cl. 524—519 15 Claims

1. A water miscible, stable, fluid product comprising aqueous gel particles of a high molecular weight water soluble polymer, said gel particles interconnected by a continuous liquid phase characterised in that the particles have a size of at least 20 microns and the continuous liquid phase is an aqueous solution of an equilibrating agent that holds the water content of the particles in the fluid product in equilibrium with the water content of the aqueous phase and that prevents substantial agglomeration of the particles in the fluid product and in which the gel polymer and equilibrating agent are selected from the combinations of gel polymer and equilibrating agent consisting of: (a) the gel polymer is an anionic polymer and the equilibrating agent is selected from the group consisting of water soluble anionic polymers of ethylenically unsaturated monomers, blends of water soluble cationic polymers of ethylenically unsaturated monomers with inorganic salts, and polydiallyldimethyl ammonium chloride; (b) the gel polymer is a cationic polymer and the equilibrating agent is selected from the group consisting of water soluble cationic polymers of ethylenically unsaturated monomers, polyethylene imine, dimethylamine-epichlorhydrin reaction product, and blends of water soluble anionic polymers of ethylenically unsaturated monomers with inorganic salts; (c) the gel polymer is a nonionic polymer and the equilibrating agent is selected from the group consisting of water soluble anionic polymers of ethylenically unsaturated monomers and water soluble cationic polymers of ethylenically unsaturated monomers; and (d) the gel polymer is a cellulosic or starch polymer and the equilibrating agent is a water soluble anionic polymer of ethylenically unsaturated monomers; said fluid product made by dispersing into the aqueous solution particles of the polymer selected from the group consisting of aqueous gel polymer particles having the size of at least about 20 microns and dry particles that will absorb water from the aqueous solution to form aqueous gel particles having a size of at least 20 microns.

4,673,705

RADIATION-CURABLE COATINGS CONTAINING REACTIVE PIGMENT DISPERSANTS

Robert E. Ansel, and Kevin P. Murray, both of Hoffmann Estates, Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Apr. 5, 1985, Ser. No. 720,251

Int. Cl.[4] C08K *3/22*, *5/20*; C08F *126/00*

U.S. Cl. 524—850 14 Claims

1. A liquid coating composition adapted to be cured by exposure to ionizing radiation comprising, a liquid vehicle of coating viscosity comprising an ethylenically unsaturated portion comprising at least about 10% of total polymerizable material of one or more polyethylenically unsaturated materials adapted to cure on radiation exposure, and an acrylate-functional radiation-curable pigment dispersant having free carboxyl groups, said dispersant being an acrylate-functional carboxylic acid amide carrying free carboxyl groups which is an adduct of a polyacrylate and a stoichiometric deficiency of a primary amine having a molecular weight of about 50 to about 8,000 to provide a secondary amine having acrylate functionality, the formation of said secondary amine being carried out at a temperature which leaves the secondary amino hydrogen atom largely unreacted, and the secondary amine functionality being reacted with a polycarboxylic acid anhydride to form amide groups therewith, and said dispersant being present in the pigment-free vehicle in an amount of 1% to 20% by weight.

12. A liquid coating composition adapted to be cured by exposure to ionizing radiation comprising, a liquid vehicle of coating viscosity comprising an ethylenically unsaturated portion comprising at least about 10% of total polymerizable material of one or more polyethylenically unsaturated materials adapted to cure on radiation exposure, pigment dispersed in the vehicle, and an acrylate-functional radiation-curable pigment dispersant having free carboxyl groups, said dispersant being an acrylate-functional carboxylic acid amide carrying free carboxyl groups which is an adduct of a polyacrylate and a stoichiometric deficiency of a primary amine having a molecular weight of about 50 to about 8,000 to provide a secondary

amine having acrylate functionality, the formation of said secondary amine being carried out at a temperature which leaves the secondary amino hydrogen atom largely unreacted, and the secondary amine functionality being reacted with a polycarboxylic acid anhydride to form amide groups therewith, and said dispersant being present in an amount of 0.25% to 7% by weight of the pigmented coating composition.

4,673,706

POLYESTER MOLDING COMPOSITIONS

Kenneth E. Atkins, S. Charleston, W. Va., assignor to Union Carbide Corporation, Danbury, Conn.

Continuation of Ser. No. 706,908, Mar. 1, 1985, abandoned, which is a continuation of Ser. No. 237,697, Feb. 24, 1981, abandoned. This application Jun. 24, 1986, Ser. No. 879,536

Int. Cl.[4] C08G *63/76*

U.S. Cl. 525—31 19 Claims

1. An improved low profile additive molding composition comprising

(a) a thermosetting polyester resin,

(b) from about 25 to 70 weight percent of a first crosslinkable vinyl monomer that is crosslinkable with the polyester resin,

(c) from about 1 to 25 weight percent of a thermoplastic low profile additive for shrinkage control,

(d) an effective amount of a second crosslinkable vinyl monomer having a reactivity ratio with styrene of greater than 1, and

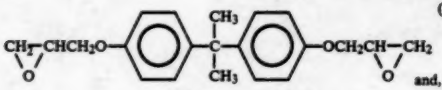
(e) from 1 to 25 weight percent of a thermosetting epoxy compound containing at least one 1,2-epoxy group per molecule, said epoxy compound being selected from the group consisting of

(1) 3,4-epoxycyclohexylmethyl 3,4-epoxycyclohexane carboxylate,

(2) 3-(3,4-epoxycyclohexane)-8,9-epoxy-2,4,-dioxaspiro[5.5]-undercane,

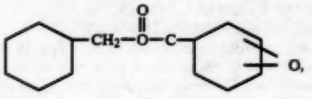
(3) bis(3,4-epoxy-cyclohexylmethyl)adipate,

(4)



and,

(5)



all weights being based on the combined weight of components (a), (b), and (c).

4,673,707

SYNTHETIC POLYMERS WITH GLYCOSIDE SIDE CHAINS

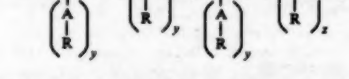
John J. Tsai, Belle Mead, and Martin M. Tessler, Edison, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Dec. 27, 1985, Ser. No. 814,131

Int. Cl.[4] C07H *15/02*

U.S. Cl. 525—54.2 21 Claims

1. A polymer represented by the formula



wherein A is O, S, S^+ R^1; A′ is S; R is $—CH_2—CH(OH)—CH_2—O—(SAC)_n$; R^1 is selected from the group consisting of R and substituted or unsubstituted alkyl, cycloalkyl, aralkyl, and alkaryl groups; $(SAC)_n$ represents a saccharide residue with n being 1–20; y and z are at least 1, with the proviso that when y and z are >1 the $—(A—R)_y$, $—(A′—R)_y$, and/or $—(A′—R)_z$ groups may be the same or different; ~~~~ represents a synthetic polymer chain; wherein the R group contains an acetal or ketal linkage from the reducing end group of $(SAC)_n$ to the 3-position of the $—CH_2—CH(OH)—CH_2—$ and an ether or sulfide linkage from the 1-position of the $—CH_2—CH(OH)—CH_2—$ to the O, S, S^+-containing group of the polymer.

4,673,708

IMPACT MODIFIED POLYETHERIMIDE-POLYCARBONATE BLENDS

John A. Rock, Becket; Norman E. Durfee, Jr., Lanesboro, both of Mass., and Robert O. Johnson, Marietta, Ga., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 28, 1984, Ser. No. 687,026

Int. Cl.[4] C08L *79/08*

U.S. Cl. 525—66 19 Claims

1. A ternary polymeric blend comprising in admixture (a) a polyetherimide, (b) a thermoplastic polycarbonate and (c) a minor amount of an acrylic rubber interpolymer composite.

4,673,709

HOT-VULCANIZABLE TREAD STRIPS FOR THE MANUFACTURE OF MOTOR VEHICLE PNEUMATIC TIRE TREADS; AND BLOCK COPOLYMERS WHICH CAN BE USED AS THE SOLE CONSTITUENT OF THE RUBBER COMPONENT WHICH IS THE BASIC FORMULATION COMPONENT OF SAID TREAD STRIPS

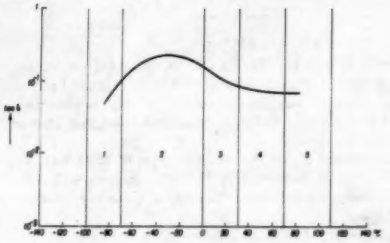
Karl-Heinz Nordsiek, Marl; Jürgen Wolpers, Bochum, and Johannes Tornau, Haltern, all of Fed. Rep. of Germany, assignors to Huls Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Apr. 17, 1985, Ser. No. 724,176

Claims priority, application Fed. Rep. of Germany, Apr. 18, 1984, 3414657; Jul. 5, 1984, 3424699

Int. Cl.[4] C08L *9/00, 53/00*

U.S. Cl. 525—99 5 Claims



1. A blend of rubbers, comprising a polymer and a block copolymer, wherein:

(a) the said polymer is produced by Ziegler polymerization of 1,3-butadiene and wherein the said polymer comprises a content of ≦10 wt.% of recurring units produced by 1,2-polymerization of 1,3-butadiene, and a content of ≧90 wt.% of recurring units produced by 1,4-polymerization of 1,3-butadiene;

(b) the said block copolymer is prepared from 1,3-butadiene and

(b1) 10 to <55 wt.% isoprene and 0 to <1 wt.% styrene, or

(b2) 10 to <35 wt.% isoprene and 1 to 15 wt.% styrene, wherein

the said block copolymer is amorphous and contains no polystyrene blocks; and wherein

the said block copolymer is prepared by polymerization in an inert organic solvent in the presence of an organolithium and a Lewis base selected from the group consisting of ethers, tertiary amines, and mixtures thereof said organolithium serving as a catalyst and, said Lewis base serving as a co-catalyst; and wherein

the said block copolymer contains an average of 45 to 80 wt.% of recurring units obtained by 1,2- and 3,4-polymerization of 1,3-butadiene and isoprene, and by polymerization of styrene, and an average of 20 to 55 wt.% of recurring units obtained by 1,4-polymerization of said 1,3-butadiene and isoprene; and wherein

the said block copolymer has sequences of chain segments in its macromolecules, wherein the glass transition temperatures (T_g) of said sequences cover a T_g temperature range or 2 or 3 partial temperature ranges of a T_g temperature range beginning at $-5°$ to $-20°$ C. and terminating at $-50°$ to $-105°$ C.; and wherein

the T_g temperature range or 1 to 3 partial temperature ranges of the T_g temperature range covered by said block copolymer corresponds to chain segments or sequences of chain segments which contain branching agents, incorporated at branch points of said segments; and wherein

(c) the said blend is further characterized by the following features:

(c1) said sequences of T_gs corresponding to said sequences of said chain segments are characterized in that the T_gs beginning at the maximum T_g, decrease steadily to the minimum T_g of the covered temperature range or of the first of the covered partial temperature ranges, said coverages of the first of the partial temperature ranges being by way of sequences of chain segments in said block copolymer; and wherein

(c2) the said blend has a Mooney viscosity (ML_{1+4} 100° C., DIN 53 523) of 30 to 130, a deformation recovery (80° C., DIN 53 514) of 12 to 45, and a nonuniformity (U=(Mw/Mn)−1) of 0.8 to 5.5; and wherein

(c3) a vulcanized test body produced from said blend by a technique analogous to that described in ISO 2322-2975 (E) for SBR, dimensioned according to DIN 53 520, and wherein tan δ for said test body is measured as a function of temperature according to the measuring method of DIN 53 520, has a plot of tan δ versus temperature which is a curve having only a single well-defined maximum, which is broad.

4,673,710
POLYVINYL CHLORIDE PLASTISOLS

Christian Burba, Ascheberg-Herbern; Ulrich Goeke, Luenen, and Norbert Esper, Bergkamen, all of Fed. Rep. of Germany, assignors to Schering AG, Berlin and Bergkamen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 454,889, Dec. 30, 1982, Pat. No. 4,533,524. This application Jan. 28, 1985, Ser. No. 695,627

Claims priority, application Fed. Rep. of Germany, Jan. 16, 1982, 3201265

Int. Cl.[4] C08L *63/02*

U.S. Cl. 525—111.5 **4 Claims**

1. A plastisol comprising a polymer of vinyl chloride, a plasticizer therefor, a filler, and from 0.5 to 5 percent, by weight of said plastisol, of an adhesion promoter which is an adduct formed between an epoxy compound and the condensation product formed between (A) a polyaminoamide which is, in turn, the reaction product of a polymerized fatty acid and an excess, based on carboxyl groups, of a polyalkylene polyamine, and (B) a carboxylic acid or ester of the formula

$$R^1—(COOR^2)_n,$$

wherein R^1 is a saturated or unsaturated aliphatic, araliphatic, or aromatic hydrocarbon having 2 to 18 carbon atoms, R^2 is hydrogen or alkyl having from 1 to 8 carbon atoms, and n is 1 or 2, wherein said carboxylic acid or ester (B) is present in an amount from 3 to 20 percent by weight of the fatty acid present in said polyaminoamide.

4,673,711
POLYMER BLEND AND METHOD FOR OBTAINING SAME

Gordon V. Sharps, Jr., Fairport, and Tien-Kuei Su, Pittsford, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Filed May 16, 1985, Ser. No. 734,434

Int. Cl.[4] C08L *23/10, 25/04*

U.S. Cl. 525—240 **30 Claims**

1. A resin extrudate which comprises the product resulting from extrusion blending from about 40 to about 95 percent by weight thereof of a first polymeric component and from about 60 to about 5 percent by weight thereof of a second polymeric component, at a shear stress level of from about 5.0×10^5 to about 1.0×10^7 dynes/cm^2, the blend being characterized by an interior region containing a disproportionately higher content of first polymeric component and an exterior region containing a disproportionately higher content of second polymeric component, the first polymeric component being selected from the group consisting of amorphous homopolymer of styrene or lower alkyl substituted styrene and amorpyhous copolymer of styrene and/or alkyl substituted styrene containing up to about 40 weight percent thereof of at least one other olefinic monomer copolymerized therewith and the second polymeric component being selected from the group consisting of crystalline homopolymer of propylene and crystalline copolymer of propylene containing up to about 30 weight percent thereof of at least one other olefinic monomer copolymerized therewith.

4,673,712
PERFLUOROALKYLVINYL POLYMER AND PRODUCTION AND USE THEREOF

Shosin Fukui, Toyonaka; Masayoshi Shinjo, Settsu; Hirokazu Aoyama, Osaka; Yasuko Okazaki, Yamato-Kohriyama; Naonori Enjo, Suita, and Kazunori Hayashi, Settsu, all of Japan, assignors to Daikin Industries Ltd., Osaka, Japan

Filed Nov. 21, 1985, Ser. No. 800,387

Claims priority, application Japan, Nov. 22, 1984, 59-247803

Int. Cl.[4] C08F *14/18*

U.S. Cl. 526—253 **12 Claims**

1. A perfluoroalkylvinyl copolymer comprising: at least 5% by weight of repeating units of the formula:

$$—CHRfCH_2— \quad (I)$$

wherein Rf is a C_5–C_{21} perfluoroalkyl group; and at least 5% by weight of repeating units of the formula:

$$—CHYCHZ— \text{ or } —\underset{\displaystyle CH_3}{\underset{|}{CH}}(COOR)CH_2— \quad (II)$$

wherein Y is —OR[1], —OCOR[1] or —COOR[1] and Z is a hydrogen atom or —COOR[2] in which R^1 and R^2 are, the same or different, a C_1–C_{18} alkyl group and the total weight of the units I and II is at least 50% by weight, with the proviso that when Y is —OR[1] or —OCOR[1], Z is a hydrogen atom, and R is a C_1–C_{18} alkyl group.

4,673,713

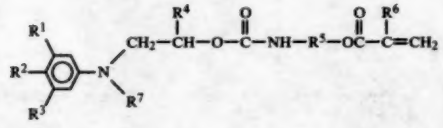
ARYLAMINE DERIVATIVES WHICH CAN BE INCORPORATED AS COPOLYMERIZED UNITS IN UNSATURATED RESINS, THE PREPARATION OF THESE DERIVATIVES AND THEIR USE AS CURING ACCELERATORS

Helmut-Martin Meier, Hattingen; Rolf Dhein, Krefeld; Jens Winkel, Cologne; Gerhard Klein, Monheim, and Werner Klöker, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Division of Ser. No. 676,485, Nov. 29, 1984, Pat. No. 4,634,791.
This application Feb. 24, 1986, Ser. No. 831,846
Claims priority, application Fed. Rep. of Germany, Dec. 13, 1983, 3345104
Int. Cl.[4] C08F *120/36*
U.S. Cl. 525—278 4 Claims

1. In an improved process for curing cold-curable, ethylenically unsaturated resins containing a curing accelerator,

the improvement comprises said curing accelerator being a compound of the formula



wherein

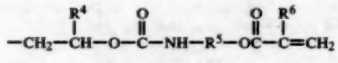
R^1 to R^3 represent hydrogen, C_1–C_{18}-alkyl, C_5–C_8-cycloalkyl, C_6–C_{14}-aryl or halogen,

R^4 represents hydrogen, C_1–C_{18}-alkyl or C_5–C_8-cycloalkyl,

R^5 represents C_1–C_{18}-alkylene, C_5–C_8-cycloalkylene or C_6–C_{14}-arylene,

R^6 represents hydrogen or C_1–C_4-alkyl and

R^7 represents hydrogen, a saturated or unsaturated hydrocarbon radical having 1–18 carbon atoms, a hydroxy-substituted saturated or unsaturated hydrocarbon radical having 1 to 18 carbon atoms, or the radical



wherein

R^4, R^5 and R^6 are as defined above.

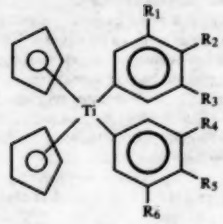
4,673,714

OLEFIN HYDROGENATION CATALYST, PROCESS FOR HYDROGENATING POLYMERS WITH THE CATALYST, AND HYDROGENATED BLOCK COPOLYMERS PRODUCED BY SAID PROCESSES

Yasushi Kishimoto, Ayase, and Tetsuo Masubuchi, Kawasaki, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 10, 1985, Ser. No. 721,701
Claims priority, application Japan, Apr. 18, 1984, 59-76614
Int. Cl.[4] C08F *8/04*
U.S. Cl. 525—314 9 Claims

1. A process for hydrogenating a diene polymer or copolymer, which comprises contacting said polymer or copolymer having a number average molecular weight of 500 to 1,000,000, in the absence of a hydrocarbon lithium compound, with hydrogen in an inert organic solvent in the presence of at least one of a titanocene diaryl compound having the general formula (I):



(I)

wherein R_1 to R_6 are independent hydrogen atoms or alkyl groups of 1 to 4 carbon atoms, and at least one of R_1 to R_3 and at least one of R_4 to R_6 are alkyl groups and at least one of R_1 to R_3 and at least one of R_4 to R_6 are hydrogen atoms, to selectively hydrogenate 50% or more of the unsaturated double bonds of said polymer or copolymer.

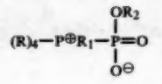
4,673,715

FLUOROELASTOMER COMPOSITION CONTAINING ACCELERATOR

Stanley W. Caywood, Jr., Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 758,716, Jul. 25, 1985. This application Aug. 27, 1986, Ser. No. 901,002
Int. Cl.[4] C08F *8/40*
U.S. Cl. 525—340 12 Claims

1. A process for curing a fluoroelastomer which comprises heating, at a temperature of from about 150°–220° C. for about 0.2–30 minutes in a steel mold cavity, a fluoroelastomer composition comprising vinylidene fluoride units, and units of at least one other fluorine-containing monomer copolymerizable with vinylidene fluoride, said monomer containing 2–7 carbon atoms and containing at least as many fluorine atoms as carbon atoms, and a phosphonate accelerator for the fluoroelastomer having the formula:



where R, R_1 and R_2 independently represent an alkyl radical of from 1–8 carbon atoms, a phenyl radical, a phenyl radical substituted with an alkyl group of 1–4 carbon atoms or an aralkyl radical having 7–13 carbon atoms.

4,673,716

HIGH MOLECULAR WEIGHT TERPOLYMERS OF ACRYLAMIDE, ACRYLIC ACID SALTS AND ALKYLACRYLAMIDE

Donald B. Siano, Fanwood, and Jan Bock, Bridgewater, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Nov. 25, 1985, Ser. No. 801,331
Int. Cl.[4] C08F *8/12*
U.S. Cl. 525—367 6 Claims

1. A homogeneous micellar redox copolymerization process for the formation of a copolymer of acrylamide and an oil soluble higher alkylacrylamide wherein said copolymer has an intrinsic viscosity of at least about 12 dl/g in 2 weight percent NaCl, which comprises the steps of:

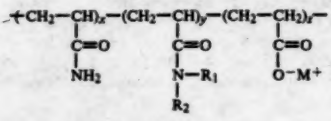
(a) forming a homogeneous mixture of a surfactant, acrylamide, water and an oil soluble higher alkylacrylamide wherein the concentration of acrylamide is about 10 to about 40 weight percent, the concentration of oil soluble higher alkylacrylamide is about 0.01 to about 4 weight

percent, and the concentration of the surfactant is about 1 to 15 weight percent; and

(b) deoxygenating said homogeneous reaction mixture by replacing the oxygen with an inert gas;

(c) adding a sufficient quantity of a redox catalyst initiator to the said deoxygenated homogeneous reaction mixture to cause copolymerization of said deoxygenated homogeneous mixture at a temperature maintained below about 40° C. without the formation of substantial amounts of particulates or a separate phase; and

(d) hydrolyzing said copolymer by the addition of alkali metal base to give a terpolymer which is characterized by the formula:



wherein R_1 is a C_6 to C_{22} straight chain or branched alkyl or cycloalkyl group; R_2 is the same or different alkyl group as R_1, or hydrogen; M^+ is an alkali metal or ammonium cation, wherein x is about 0.50 to about 0.999; y is about 0.001 to about 0.05; and z is about 0.05 to about 0.50.

4,673,717

PROCESS FOR THE MODIFICATION OF AROMATIC POLYMERS VIA FRIEDEL-CRAFTS REACTIONS TO PRODUCE NOVEL POLYMERS AND THE USE THEREOF

Elena S. Percec, Pepper Pike, and George S. Li, Macedonia, both of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

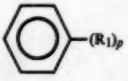
Division of Ser. No. 657,137, Oct. 3, 1984, Pat. No. 4,596,860. This application Jan. 30, 1986, Ser. No. 824,129

Int. Cl.[4] C08G *65/48*; C08L *71/04*

U.S. Cl. 525—390 **2 Claims**

1. Novel substituted polyarylene polymers having the formula

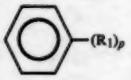
wherein each R is independently a C_1 to C_8 aliphatic or a C_5 to C_7 cycloaliphatic radical, an aryl radical having the formula



wherein each R_1 is independently a C_1 to C_8 aliphatic radical and p is an integer of 0 to 4, each radical being free of a tertiary alpha-carbon atom; A is hydrogen, halogen, an aliphatic or an aryl radical; Y is a divalent oxygen or sulfur atom or a carbonate group; n is an integer of from about 75 to about 10,000; and wherein G is present in at least five percent of said polyarylene units and is selected from the group consisting of alkyl sulfonyls having the formula

where R_{2a} is a C_1 to C_{20} aliphatic radical and sulfonamides having the formula

where R_2 is a C_1 to C_{20} aliphatic or aryl radical of the formula



or a naphthyl radical where R_1 and p are as described above.

4,673,718

POLYSILOXANE GRAFT COPOLYMERS, FLEXIBLE COATING COMPOSITIONS COMPRISING SAME AND BRANCHED POLYSILOXANE MACROMERS FOR PREPARING SAME

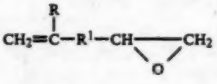
Rose A. Ryntz, Mt. Clemens, and Kenneth R. Kurple, Anchorville, both of Mich., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 6, 1986, Ser. No. 816,485

Int. Cl.[4] C08F *283/00*

U.S. Cl. 525—476 **25 Claims**

1. Hydroxy functional polysiloxane graft copolymer suitable for flexible, thermosetting coating compositions over metal and plastic substrates, which copolymer has number average molecular weight between about 1,000 and about 15,000, has a hydroxyl number between about 30 and about 300, and is the reaction product of carbon-carbon double bond-reactive monoethylenically unsaturated monomer with hydroxy functional carbon-carbon double bond-bearing branched polysiloxane macromer, under free radical polymerization reaction conditions, said monomer bearing substantially no functionality which is substantially reactive with hydroxy functionality of said macromer under said reaction conditions, and said macromer being the reaction product of (i) epoxy monomer having the formula:



wherein R is hydrogen or C1 to about C7 alkyl, and R^1 is C1 to about C7 alkyl or $COO(CH_2)_n$, n being 0 to about 7, with (ii) hydroxy functional polysiloxane reactant having about 0–10 urethane groups per molecule.

4,673,719

PROCESS FOR PRODUCING OLEFIN POLYMERS AND CATALYST COMPOSITION THEREFOR

Mamoru Kioka, Ohtake, and Norio Kashiwa, Iwakuni, both of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Dec. 20, 1983, Ser. No. 563,320
Claims priority, application Japan, Dec. 24, 1982, 57-225998
Int. Cl.[4] C08F *4/64, 10/02*
U.S. Cl. 526—125 10 Claims

1. A solid titanium catalyst component containing magnesium, titanium and halogen as essential ingredients for use in the polymerization of ethylene or copolymerization of ethylene with not more than 10 mole% of an alpha-olefin having 3 to 10 carbon atoms and/or a diene, said catalyst component consisting essentially of the reaction product which is obtained by contacting a magnesium compound (i) in the liquid state having no reducing ability with (ii) a titanium compound in the liquid state to form a solid product, or first preparing a liquid mixture of the magnesium compound (i) and the titanium compound (ii) and then forming a solid product therefrom, said reaction of forming the solid product being carried out in the presence of at least one electron donor (iii) consisting of aryloxy group-containing alcohols, said solid product not coming into contact whether during or after its formation, with esters of polycarboxylic acids or esters of polyhydroxy compounds, said catalyst component having a magnesium/titanium atomic ratio of from about 2 to about 100, a halogen/titanium atomic ratio of from about 4 to about 100, and an electron donor/titanium molar ratio of from about 0.01 to about 100.

4,673,720

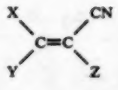
ELECTROCONDUCTIVE POLYMER AND PROCESS FOR PREPARATION THEREOF

Kiichiro Matsumura; Akio Takahashi, and Jun Tsukamoto, all of Otsu, Japan, assignors to Director-General of Agency of Industrial Science and Technology, Tokyo, Japan

Filed Aug. 4, 1983, Ser. No. 520,197
Claims priority, application Japan, Aug. 7, 1982, 57-136831; Aug. 7, 1982, 57-136832; Jan. 27, 1983, 58-10514
Int. Cl.[4] C08F *38/00*; H01B *1/00, 1/06*
U.S. Cl. 526—285 13 Claims

1. A process for the preparation of an electroconductive polymer, which comprises heating cyanoacetylene or dicyanoacetylene in a gas phase at a temperature of at least 150° C. to about 3,400° C. and a vapor pressure of 1 mmHg to 760 mmHg in the presence of a heat resistant substrate whereby the cyanoacetylene or dicyanoacetylene is polymerized and carbonized on the substrate.

2. A process for the preparation of an electroconductive polymer, which comprises heating a monoethylenically unsaturated compound represented by the following general formula:



wherein X, Y and Z are selected from the group consisting of a hydrogen atom, a halogen atom and an alkyl group, in the gas phase at a temperature of at least 500° C. to about 3,400° C. and a vapor pressure of 1 mmHg to 760 mmHg in the presence of a heat resistant substrate whereby the monoethylenically unsaturated compound is polymerized and carbonized on the substrate.

4,673,721

POLYACRYLONITRILES WITH A LOW K VALUE

Tibor Krakkay, Munich; Tatjana Poggi, Saal, and Ernst Schubert, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 636,965, Aug. 2, 1984, abandoned. This application Mar. 13, 1986, Ser. No. 839,288
Claims priority, application Fed. Rep. of Germany, Aug. 5, 1983, 3328276
Int. Cl.[4] C08F *20/44, 20/42*
U.S. Cl. 526—329.3 1 Claim

1. A homopolymer or copolymer of acrylonitrile which contains at least 60% by weight of acrylonitrile units and up to 40% by weight of units which can be copolymerized with acrylonitrile, in which said polymer is characterized by a Fikentscher K value in the range of 34 to 15 and a total content of sulfonate and sulfate end groups, which do not originate from comonomers containing sulfonate or sulfate groups, of 250 to 1,000 milliequivalents per kg of polymer, with a content of sulfonate end groups of 180 to 900 milliequivalents per kg of polymer.

4,673,722

HIGH IMPACT NYLON/POLYUREA COPOLYMER

Zachariah G. Gardlund, Utica, and MaryAnn Bator, Mt. Clemens, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 23, 1985, Ser. No. 812,762
Int. Cl.[4] C08G *18/34*
U.S. Cl. 528—73 10 Claims

1. A method of forming a high impact strength article of nylon/polyurea copolymer by reaction injection molding a polyurea prepolymer and a caprolactam together comprising the steps of rapidly mixing a polyurea prepolymer with suitable amounts of caprolactam and a caprolactam alkali metal salt initiator and adding said mixture to a heated mold to polymerize said mixture and therein form said article with the proviso that the molecular weight of the polyurea is 2,000 to 40,000 and that the concentration of polyurea in the copolymer is 25 to 70%.

4,673,723

POLYAMIDE OLIGOMER-EPOXY POLYMERS AND METHODS FOR THEIR PREPARATION AND USE

Daniel Cuzin, Bernay, France, assignor to ATOCHEM, France

Filed Aug. 22, 1985, Ser. No. 768,415
Claims priority, application France, Aug. 27, 1984, 84 13244
Int. Cl.[4] C08G *59/40, 59/42, 65/00*
U.S. Cl. 528—113 26 Claims

1. A composition for the preparation of thermosetting or thermoplastic polymers, which composition comprises a mixture of at least one polyepoxide and at least one polyamide oligomer which polyepoxide and oligomer can react to form a polymer, wherein the oligomer is a primary monoamine, an alpha,omega-primary or -secondary diamine, an alpha,omega-diacid or an alpha-primary amine,omega-acid.

20. A thermoplastic polymer prepared by melting the composition according to claim 1 and thereby reacting the polyepoxide and the oligomer.

4,673,724

POLYMERIC WHISKER AND PRODUCTION OF THE SAME

Seiji Endoh; Kunio Kimura; Toshihiko Ohta, all of Ohtsu, and Yasuo Kato, Shiga, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Dec. 4, 1985, Ser. No. 804,419

Claims priority, application Japan, Dec. 7, 1984, 59-259585; May 27, 1985, 60-113868; May 31, 1985, 60-119017

Int. Cl.[4] C08G 63/06, 65/38

U.S. Cl. 528—206 16 Claims

1. A crystalline polymeric whisker comprising repeating units derived from a compound selected from the group consisting of p-oxybenzoyl and 2-oxy-6-natphthoyl, said whisker having a length (L) of 6 to 200 μm, a diameter (D) of 0.2 to 5 μm and an L/D ratio of not less than 10.

4,673,725

PROCESS FOR THE PREPARATION OF AROMATIC OLIGOMERS

Michael E. B. Jones, Chester, England, assignor to Imperial Chemical Industries PLC, London, England

Division of Ser. No. 725,347, Apr. 19, 1985, Pat. No. 4,599,373, and Ser. No. 558,525, Dec. 6, 1983, Pat. No. 4,530,992. This application May 15, 1986, Ser. No. 863,417

Claims priority, application United Kingdom, Dec. 6, 1982, 8234715; May 27, 1983, 8314707

Int. Cl.[4] C08G 12/04

U.S. Cl. 528—266 6 Claims

1. A process for the preparation of a composition which comprises an oligomer bearing aromatic amino groups which process comprises at least the step of reacting (A) an oligomer which (i) comprises the repeating unit —Ar^1—CHR—, wherein A^1, each of which may be the same of different, is an aromatic group or a substituted derivative thereof and R, each of which may be the same or different, is hydrogen or a hydrocarbyl group and (ii) bears pendant and/or terminal hydroxymethyl or acyloxymethyl groups, which (B) one or more equivalents of an aniline for each of the said hydroxymethyl or acyloxymethyl groups.

4,673,726

POLY(ESTER-IMIDES) AND POLY(ESTER-IMIDE-AMIDES) OF TRIMELLITIC ANHYDRIDE AND 4-(AMINOMETHYL)CYCLOHEXANEMETHANOL

Winston J. Jackson, Jr., and John C. Morris, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 13, 1986, Ser. No. 818,301

Int. Cl.[4] C08G 63/18

U.S. Cl. 528—288 4 Claims

1. Polymer composition comprising 5 to 98 mol % of repeating units from trimellitic acid or anhydride, 5 to 98 mol % of repeating units from 4-(aminomethyl)cyclohexanemethanol, 2 to 95 mol % of repeating units from aromatic dicarboxylic acids or esters thereof containing 8 to 16 carbon atoms and having at least three carbon atoms between carboxyl groups, and 2 to 95 mol % of repeating units from 1,4-cyclohexanedimethanol and wherein the mol % of the repeating units from trimellitic acid or anhydride does not exceed the mol % of repeating units from the 4-(aminomethyl)cyclohexanemethanol.

4,673,727

NOVEL POLY(ESTER-AMIDE) COMPOSITIONS

George E. Miller, Jr., Savannah, Ga., assignor to Union Camp Corporation, Wayne, N.J.

Filed May 30, 1986, Ser. No. 868,632

Int. Cl.[4] C08G 63/48

U.S. Cl. 528—295.5 10 Claims

1. The hydroxy-terminated partial ester of:

(I) a diol; and

(II) the polymerization product of carboxylic acids and amines with 10–30% equivalent excess of acid comprised of:

(a) 60–85 equivalent percent of a polyacid selected from the group consisting of dimer C_8–C_{24} fatty acids and C_{19}–C_{21} dicarboxylic acids;

(b) 0–25 equivalent percent of a monomeric C_{16}–C18 fatty acid; and

(c) 15–40 equivalent percent of a monomeric C_2–C_4 fatty acid; and

(d) a mixture of diamines comprising:

(i) 40–80 equivalent percent of ethylenediamine; and

(ii) 10–45 equivalent percent of a C_6 diamine.

4,673,728

PROCESS FOR THE PRODUCTION OF COPOLYAMIDE FROM AROMATIC DICARBOXYLIC ACIDS, ADIPIC ACID AND HEXAMETHYLENE DIAMINE

Werner Nielinger; Hermann Brinkmeyer; Rudolf Binsack; Ludwig Bottenbruch, all of Krefeld, and Heinz-Josef Füllmann, Leichlingen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Feb. 18, 1986, Ser. No. 830,269

Claims priority, application Fed. Rep. of Germany, Feb. 26, 1985, 3506656

Int. Cl.[4] C08G 69/26

U.S. Cl. 528—339 5 Claims

1. A process for the production of copolyamide from adipic acid, terephthalic acid, isophthalic acid and hexamethylene diamine having from 30 to 51.5% by weight of units of hexamethylene adipic amide, wherein from 40 to 70% of an aqueous solution of monomers is heated in less than 15 min under a pressure of at least 35 bars to at least 250° C. and the water is distilled off in one or more stages under a pressure of from 1 to 40 bars, whereby a preliminary copolyamide condensation product with a relative viscosity of from 1.2 to 2.5 measured on a 1% solution in m-cresol at 25° C., is obtained the condensation of which is continued in the solid phase.

4,673,729

PAPER AUXILIARY FROM CONDENSATION PRODUCT OF ALIPHATIC POLYOL-ETHER-AMINE AND COMPOUND POLYFUNCTIONAL TOWARD AMINO GROUPS

Wolf-Dieter Schröer; Janos Muszik; Günther Cramm, all of Leverkusen, and Otto Benn, Bergisch Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 29, 1985, Ser. No. 717,410

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1984, 3413567

Int. Cl.[4] C08G 61/00; D21H 3/58

U.S. Cl. 528—397 7 Claims

1. In a condensation product suitable for increasing the retention of fibers, fillers and pigments and for accelerating drainage in papermaking, and as flocculating agents in the working up of effluents from papermaking by filtration, sedimentation and flotation, the condensation product being obtained by reacting

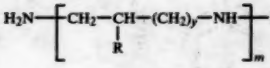
(A) an aliphatic polyol-ether-amine and

(B) a compound which is polyfunctional toward amino groups,

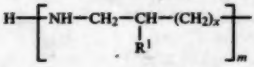
the improvement wherein

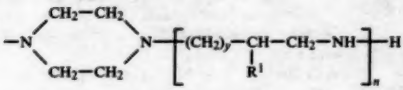
(A) is an aliphatic polyol-ether-amine which is free from halogen groups, contains cohesive polyether segments and carries no amino groups within these segments, and which is obtained by reaction of an ω-polychloropolyolether with a functionality of 1.90–3.10 moles of Cl/mole, with at least one compound selected from the group consisting of

(a) a polyalkylenepolyamine of the formula

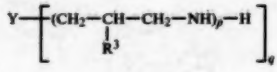


in which
R is H or CH_3,
y is 0 or 1, and
m is from 1 to 50,
(b) a polyalkylenepolyamine of the formula

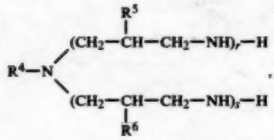




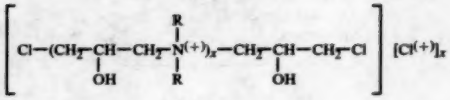
in which
R^1 is H or CH_3,
x and y each independently is 0 or 1,
m is from 1 to 50, and
n is from 0 to 50,
(c) a polyalkylenpolyamine of the formula



in which
Y is oxygen, sulphur, or an at least divalent radical of an aliphatic, cycloaliphatic, araliphatic, or aromatic compound containing at least one member selected from the group consisting of a hydroxyl and sulphhydryl radical,
R^3 is hydrogen or CH_3,
p is at least 1, and
q is at least 2, and
(d) an amine of the formula



in which
R^4 is a C_{1-C18}-alkyl radical which is unsubstituted or substituted by an amino or hydroxyl group,
R^5 and R^6 each independently is hydrogen or a methyl group and
r and s each independently is from 1 to 20,
and
(B) is a compound selected from the group consisting of an α,ω-alkyldihalide, halogenhydrin, epihalogenohydrins, bis-epoxy-compound, chloroformic acid ester, glycidylether of polyalkylene oxide and a bifunctional alkylating agent of the formula



in which
R is H or CH_3, and
X is 1 to 3,
and (B) is employed in an amount such that the condensation product is water-soluble and in 25 percent strength aqueous solution at 25° C. has a viscosity of 100 to 1,000 mPa.s.

4,673,730

METHOD FOR RECOVERING AROMATIC POLYETHERS

Hermann Siegert, and Werner Ude, both of Darmstadt, Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Filed Apr. 18, 1986, Ser. No. 853,732

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1985, 3515138

Int. Cl.[4] C08L *89/00*

U.S. Cl. 528—491 **6 Claims**

1. A method for recovering an aromatic polyether as a solid from a solution thereof in an organic solvent, which method comprises precipitating said polyether with at least one fluorinated hydrocarbon having 1 to 4 carbon atoms and having no or no more than 4 hydrogen atoms in the molecule.

4,673,731

NOVEL POLYMERS AND COPOLYMERS AND PRODUCTION OF POLY(ACETYLENE)

William J. Feast, Durham, and Jeremy N. Winter, South Croydon, both of England, assignors to The British Petroleum Company, p.l.c., London, England

Division of Ser. No. 760,486, Jul. 30, 1985, Pat. No. 4,626,580. This application Jan. 7, 1986, Ser. No. 816,713

Claims priority, application United Kingdom, Aug. 4, 1984, 8419949; Aug. 25, 1984, 8421643; Sep. 8, 1984, 8422743

Int. Cl.[4] C08F *6/06, 236/16, 232/08*

U.S. Cl. 528—503 **8 Claims**

1. A process for the producing poly(acetylene) comprising solvent casting a solution of a polymer essentially consisting of 3,6-bis(trifluoromethyl)pentacyclo [6.2.0.$0^{2,4}$.$0^{3,6}$.$0^{5,7}$]dec-9-ene (IV), and heating at a temperature of between 50° and 120° C. under reduced pressure over a duration of between 1 and 100 hours in an inert atmosphere.

4,673,732

POLYPEPTIDE RELATING TO α-HANP

Yoshiaki Kiso, Osaka, and Kazuwa Nakao, Kyoto, both of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Aug. 26, 1985, Ser. No. 769,333

Claims priority, application Japan, Aug. 24, 1984, 59-176953

Int. Cl.[4] C07K *7/06, 7/08*

U.S. Cl. 530—326 **4 Claims**

1. A polypeptide represented by the general formula:

R-Asn-Ser-Phe-Arg-Tyr-OH

wherein R is
H,
Cys,
Gly-Cys,
Leu-Gly-Cys,
Gly-Leu-Gly-Cys,
Ser-Gly-Leu-Gly-Cys,

Gln-Ser-Gly-Leu-Gly-Cys,
Ala-Gln-Ser-Gly-Leu-Gly-Cys,
Gly-Ala-Gln-Ser-Gly-Leu-Gly-Cys,
or Ile-Gly-Ala-Gln-Ser-Gly-Leu-Gly-Cys,
and the salt thereof.

4,673,733

TREATMENT OF BIOLOGICAL AND PHARMACEUTICAL PRODUCTS ADSORBED ON A SOLID PHASE WITH VIRUS AND PYROGEN INACTIVATING AGENTS

Sudhish Chandra, 884 S. McKinley Ave., Kankakee, Ill. 60901, and Fred Feldman, 407 Gettysburg, Park Forest, Ill. 60466

Filed Apr. 11, 1985, Ser. No. 722,561
Int. Cl.[4] A61K *35/14;* **C07G** *7/06*
U.S. Cl. 530—344 **28 Claims**

1. A method to depyrogenate or inactivate viruses in a biological or pharmaceutical product comprising the steps of:
adsorbing said product onto a solid phase;
contacting said product adsorbed on said solid phase with a virus inactivating or depyrogenating agent;
separating the solid phase from the virus inactivating or depyrogenating agent;
removing impurities and residual inactivating or depyrogenating agent from the solid phase; and
recovering the product from the solid phase.

4,673,734

POROUS MINERAL SUPPORT COATED WITH AN AMINATED POLYSACCHARIDE POLYMER

Jean-Louis Tayot, LaTour de Salvagny, and Michel Tardy, Lyons, both of France, assignors to Institut Merieux, Lyons, France

Continuation of Ser. No. 238,957, Feb. 27, 1981, abandoned, which is a continuation of Ser. No. 708,632, Jul. 26, 1976, abandoned. This application Mar. 21, 1985, Ser. No. 714,525
Claims priority, application Luxembourg, Jul. 29, 1975, 73094
Int. Cl.[4] B01J *20/32, 20/26, 20/22;* **B01D** *15/08*
U.S. Cl. 530—364 **6 Claims**

1. A method for purifying or separating biologic macromolecules using a particulate material comprising a plurality of porous mineral support particles impregnated with and containing a sufficient amount of an aminated polysaccharide polymer so as to permit reversibly fixing said biologic macromolecules therewith, said method comprising contacting said particulate material with a solution containing said biologic macromolecules and regulating the pH and the molarity of said solution so that the said particulate material fixes selectively either the said biologic macromolecules or undesired impurities contained in said solution.

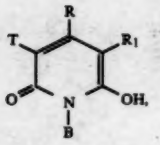
4,673,735

AZO COMPOUNDS HAVING AT LEAST ONE 6-HYDROXYPYRID-2-ONE COUPLING COMPONENT RADICAL METAL COMPLEXES THEREOF AND INTERMEDIATES THEREFOR

Helmut Moser, Oberwil; Manfred Greve, Dornach; Reinhard Pedrazzi, Allschwil, all of Switzerland, and Roland Wald, Huningue, France, assignors to Sandoz Ltd., Basel, Switzerland

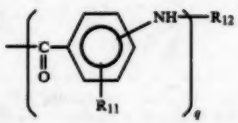
Continuation-in-part of Ser. No. 485,212, Apr. 15, 1983, abandoned. This application Apr. 9, 1984, Ser. No. 598,236
Claims priority, application Fed. Rep. of Germany, Apr. 15, 1982, 3213826; Jan. 29, 1983, 3302950; May 9, 1983, 3316915; May 9, 1983, 3316915
Int. Cl.[4] C09B *44/02, 44/04, 44/06, 44/08*
U.S. Cl. 534—606 **13 Claims**

1. A metal-free compound of the formula

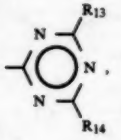


(I)

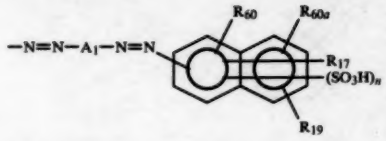
or a 1:1 or 1:2 metal complex thereof, or an acid addition salt of a metal-free compound of said formula or a 1:1 or 1:2 metal complex thereof,
wherein
B is hydrogen; C_{1-4}alkyl; C_{1-4}alkyl monosubstituted by C_{1-4}alkoxy; C_{2-4}alkyl substituted by hydroxy; C_{5-6}cycloalkyl; C_{5-6}cycloalkyl substituted by 1 to 3 C_{1-4}alkyl groups; phenyl(C_{1-3}alkyl); phenyl(C_{1-3}alkyl) the phenyl group of which is substituted by 1 to 3 substituents selected from C_{1-4}alkyl, C_{1-4}alkoxy and halo; —A—NH—R_2; —A_4—$N(R_7)_2$; —A_4—$N^{\oplus}(R_8)_2R_9A^{\ominus}$ or —$N(R_7)_2$,
wherein
A is linear or branched C_{2-8}alkylene; linear or branched C_{2-8}alkylene interrupted by 1 or 2 hetero atoms; linear or branched C_{2-8}alkenylene; linear or branched C_{2-8}alkenylene interrupted by 1 or 2 hetero atoms; phenylene or cyclohexylene,
A_4 is linear or branched C_{2-8}alkylene or linear or branched C_{2-8}alkenylene,
A_4' is linear or branched C_{1-8}alkylene or linear or branched C_{2-8}alkenylene, and
R_2 is



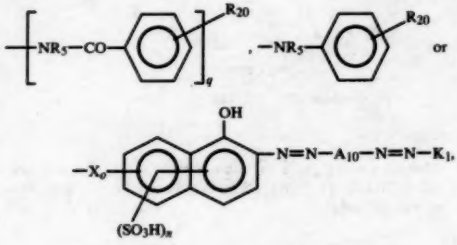
wherein
R_{11} is hydrogen, halo, nitro, C_{1-4}alkyl or C_{1-4}alkoxy, and
R_{12} is —CO—$(CH_2)_a$—Z or



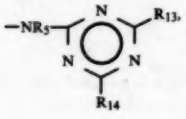
wherein Z is —$N(R_7)_2$ or —$N^{\oplus}(R_8)_2R_9A^{\ominus}$, and a is 1, 2 or 3,
R is hydrogen; C_{1-4}alkyl; C_{5-6}cycloalkyl; C_{5-6}cycloalkyl substituted by 1 or 2 C_{1-4}alkyl groups; phenyl; phenyl substituted by 1 or 2 substituents selected from methyl, ethyl, methoxy and ethoxy; benzyl; phenylethyl; or benzyl or phenylethyl the phenyl group of which is substituted by 1 or 2 substituents selected from methyl, ethyl, methoxy and ethoxy,
R_1 is hydrogen or —N=N—D,
wherein D is a diazo component radical, with the proviso that R_1 must be



when B is other than —A—NH—R_2,
wherein
A_1 is a tetrazo component radical,
R_{17} is hydrogen, —N=N—K_1, —N=N—A_{10}—N=N—K_1,

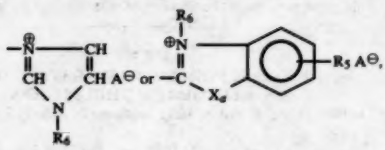


wherein
A_{10} is a tetrazo component radical or a coupling/diazo component radical,
K_1 is a diazo component radical or a coupling component radical,
R_{20} is —$(NR_5)_q$—Q_1—$N(R_7)_2$, —$(NR_5)_q$—Q_2—$N^{\oplus}(R_8)_2R_9A^{\ominus}$ or

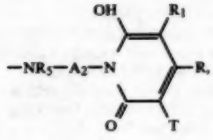


wherein
Q_1 is linear or branched C_{2-6}alkylene, —CH_2C^*O— or —CH_2—CON^*H—, wherein the * denotes the atom attached to the —$(NR_5)_q$— radical, and
Q_2 is linear or branched C_{2-6}alkylene, —CH_2C^*O—, —CH_2CON^*H— or —CH_2CONHC^*O—, wherein the * denotes the atom attached to the —$(NR_5)_q$— radical,
X_o is a bridging radical,
R_{19} is hydrogen; hydroxy; amino; (C_{1-4}alkyl)carbonylamino; benzoylamino; phenylamino; or benzoylamino or phenylamino the phenyl group of which is substituted by 1 or 2 substituents selected from halo, nitro, amino, C_{1-4}alkyl and C_{1-4}alkoxy, with the proviso that R_{19} must be hydrogen when R_{17} is other than —N=N—K_1 and —N=N—A_{10}—N=N—K_1, and
R_{60} is hydroxy or amino, and
R_{60a} is hydrogen, hydroxy or amino, with the proviso that R_{60a} is hydrogen or amino when R_{60} is hydroxy and is hydroxy when R_{60} is amino, and
T is hydrogen, cyano, —$COOR_4$, —CO—$N(R_5)_2$, —SO_2—$N(R_5)_2$,

-continued



wherein
each R_3 is independently hydrogen, C_{1-4}alkyl, —$N(R_5)_2$ or —CO—$N(R_5)_2$,
R_4 is C_{1-6}alkyl or phenyl(C_{1-3}alkyl),
R_6 is C_{1-4}alkyl, and
X_a is —O—, —NR_5— or —S—,
wherein
each R_5 is independently hydrogen or C_{1-4}alkyl or, when two R_5's are attached to a nitrogen atom, both R_5's taken together and with the nitrogen atom may form a saturated ring containing 1 to 3 hetero atoms,
each R_7 is independently hydrogen; C_{1-6}alkyl; C_{2-6}alkyl monosubstituted by halo, hydroxy or cyano; phenyl(C_{1-3}alkyl); phenyl(C_{1-3}alkyl) the phenyl group of which is substituted by 1 to 3 substituents selected from halo, C_{1-4}alkyl and C_{1-4}alkoxy; C_{5-6}cycloalkyl or C_{5-6}cycloalkyl substituted by 1 or 3 C_{1-4}alkyl groups, or both R_7's taken together and with the nitrogen atom to which they are attached form a 5- or 6-membered saturated ring containing 1 to 3 hetero atoms,
each R_8 is independently C_{1-6}alkyl; C_{2-6}alkyl monosubstituted by halo, hydroxy or cyano; phenyl(C_{1-3}alkyl); phenyl(C_{1-3}alkyl) the phenyl group of which is substituted by 1 to 3 substituents selected from halo, C_{1-4}alkyl and C_{1-4}alkoxy; C_{5-6}cycloalkyl or C_{5-6}cycloalkyl substituted by 1 or 3 C_{1-4}alkyl groups,
each R_9 is independently C_{1-4}alkyl or C_{1-4}alkyl substituted by phenyl or both R_8's and R_9 taken together and with the nitrogen atom to which they are attached are pyridinium; pyridinium substituted by 1 or 2 C_{1-4}alkyl groups; or a 5- or 6-membered saturated ring containing 1 to 3 hetero atoms,
each R_{13} is independently amino; an aliphatic, cycloaliphatic, aromatic or heterocyclic amino group the nitrogen atom of which is attached to the 1,3,5-triazine ring; halo; hydroxy; C_{1-4}alkoxy; phenyl or



wherein
A_2 is linear or branched C_{2-6}alkylene or —N^*H—$COCH_2$—,
wherein the * denotes the atom attached to the —NR_5— radical, and R, R_1, R_5 and T are as defined above,
each R_{14} is independently an aliphatic, cycloaliphatic, aromatic or heterocyclic amino group the nitrogen atom of which is attached to the 1,3,5-triazine ring,
each n is independently 0, 1 or 2,
each q is independently 0 or 1, and
each $A^{\ominus}$ is independently a non-chromophoric anion,
with the provisos that (i) when the compound of Formula I is a monoazo compound free of sulfo groups, it contains at least one water-solubilizing basic or cationic group, (ii) when the compound of Formula I is free of sulfo groups and is other than a monoazo compound, it contains at least two water-solubiliz-

ing groups, and (iii) when the compound of Formula I contains one or more sulfo groups, the total number of basic and cationic groups exceeds the number of sulfo groups by at least one.

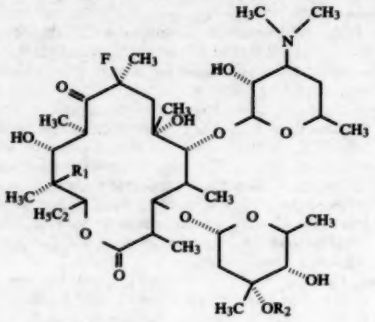
4,673,736

PROCESS FOR THE PREPARATION OF (8S)-8-FLUOROERYTHROMYCINS

Luciano Toscano, Milan, Italy, assignor to Pierrel SpA, Naples, Italy

Filed Jul. 11, 1984, Ser. No. 629,768
Claims priority, application Italy, Jul. 18, 1983, 22104 A/83
Int. Cl.⁴ C07H 1/00, 17/08
U.S. Cl. 536—7.2 **10 Claims**

1. A process for preparing (8S)-8-fluoroerythromycin having the formula



wherein R_1 is selected from the group consisting of hydrogen and hydroxy and R_2 is selected from the group consisting of hydrogen and methyl, said process comprising fluorinating in one step an acetic solution of the corresponding 8,9-anhydroerythromycin 6, 9-hemiketal having an unprotected N-dimethyl group with perchloryl fluoride, said acetic solution being diluted with water and an inert solvent selected from tetrahydrofuran, pyridine and dioxane, said fluorination being carried out at a temperature of between about −5° C. and +50° C. and at a pH 4 to 7 to directly convert said hemiketal into said (8S)-8-fluoroerythromycin.

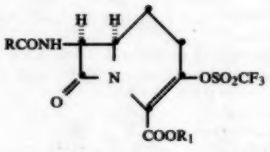
4,673,737

7-ACYLAMINO-(OR 7-AMINO)-3-TRIFLUOROMETHYLSULFONYLOXY-1-CARBA(1-DETHIA)-3-CEPHEM-4-CARBOXYLIC ACIDS AND ESTERS THEREOF

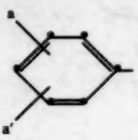
David A. Evans, Concord, and Eric B. Sjogren, Arlington, both of Mass., assignors to Harvard University, Cambridge, Mass.

Filed Aug. 2, 1985, Ser. No. 761,647
Int. Cl.⁴ C07D 471/04
U.S. Cl. 540—205 **18 Claims**

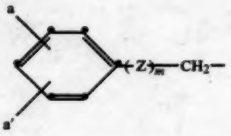
1. A compound of the formula



wherein R is hydrogen, C_1–C_6 alkyl, C_1–C_6 alkyl substituted by cyano, carboxy, halogen, amino, C_1–C_4 alkoxy, C_1–C_4 alkylthio, or trifluoromethylthio; a phenyl or substituted phenyl group represented by the formula



wherein a and a′ independently are hydrogen, halogen, hydroxy, C_1–C_4 alkoxy, C_1–C_4 alkanoyloxy, C_1–C_4 alkyl, C_1–C_4 alkylthio, amino, C_1–C_4 alkanoylamino, C_1–C_4 alkylsulfonylamino, carboxy, carbamoyl, hydroxymethyl, aminomethyl, or carboxymethyl; a group of the formula

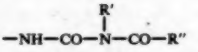


wherein a and a′ have the same meanings as defined above, Z is O or S, and m is 0 or 1; a heteroarylmethyl group represented by the formula

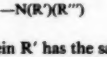
wherein R^1 is thienyl, furyl, benzothienyl, benzofuryl, indolyl, triazolyl, tetrazolyl, oxazolyl, thiazolyl, oxadiazolyl, thiadiazolyl, and such heteroaryl groups mono-substituted by amino, hydroxy, halogen, C_1–C_4 alkyl, or C_1–C_4 alkoxy, or C_1–C_4 alkylsulfonylamino; a substituted methyl group of the formula

wherein R^2 is cyclohex-1,4-dienyl or a phenyl group or substituted phenyl group represented by the formula

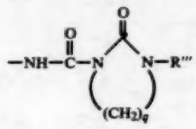
wherein a and a′ have the same meanings as defined above, or R^2 is R^1 as defined above, and Q is hydroxy, C_1–C_4 alkanoyloxy, carboxy, sulfo, amino, or a substituted amino group of the formula



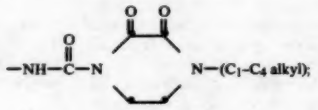
wherein R′ is hydrogen or C_1–C_4 alkyl, and R″ is C_1–C_4 alkyl, furyl, thienyl, phenyl, halophenyl, nitrophenyl, styryl, halostyryl, nitrostyryl or the group



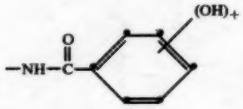
wherein R′ has the same meanings as defined above and R‴ is hydrogen, C_1–C_3 alkylsulfonyl, C_1–C_3 alkyl, or C_1–C_4 alkanoyl; or Q is a group of the formula



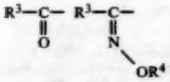
wherein R''' has the same meanings as defined above, and q is 2 or 3; or Q is a group of the formula



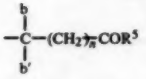
or Q is a benzamido group of the formula



wherein t is 1 to 3; or R is a keto group or an oximino group of the formulae



wherein R^3 is R^1 or R^2 as defined above and R^4 is hydrogen, C_1–C_4 alkyl, or a carboxy-substituted alkyl or cycloalkyl group of the formula



wherein b and b' when taken independently are hydrogen or C_1–C_3 alkyl, and when taken together with the carbon atom to which they are bonded form a 3- to 6-membered carbocyclic ring, and R^5 is hydroxy, C_1–C_4 alkoxy, amino, C_1–C_4 alkylamino, or di-(C_1–C_4 alkyl)-amino; R_1 is hydrogen or a carboxy-protecting group, and when R_1 is hydrogen the pharmaceutically acceptable non-toxic salts thereof.

4,673,738

NOVEL INTERMEDIATES OF CEPHALOSPORINS AND PROCESS FOR PRODUCING 7-(SUBSTITUTED OR UNSUBSTITUTED AMINO)-3-SUBSTITUTED METHYL-Δ^3-CEPHEM-4-CARBOXYLIC ACIDS

Hiroshi Sadaki; Hirokazu Narita; Hiroyuki Imaizumi, all of Toyama; Yoshinori Konishi, Takaoka; Takihiro Inaba, Namerikawa; Tatsuo Hirakawa, Toyama; Hideo Taki, Sagamihara; Masaru Tai, Toyama; Yasuo Watanabe, Toyama, and Isamu Saikawa, Toyama, all of Japan, assignors to Handi-Pac Inc., Hermann, Mo.

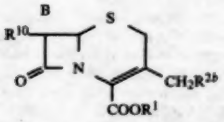
Division of Ser. No. 304,912, Sep. 23, 1981, Pat. No. 4,489,072. This application Sep. 26, 1984, Ser. No. 654,681

Claims priority, application Japan, Sep. 25, 1980, 55-132253; Nov. 12, 1980, 55-158184; Dec. 13, 1980, 55-175263

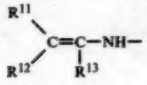
Int. Cl.[4] C07D *501/38, 501/40, 501/46*

U.S. Cl. 540—222 **5 Claims**

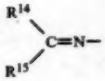
1. 7-(Substituted or unsubstituted amino)-3-substituted methyl-Δ^3-cephem-4-carboxylic acid represented by the following formula or a salt thereof:



wherein R^1 represents a hydrogen atom or a carboxyl-protecting group; R^{2b} represents a 2-(1,2,3,4-tetrazolyl) group, attached to the exomethylene group at the 3-position of the cephem ring through a carbon-nitrogen bond, which may be substituted by one substitutent selected from the group consisting of halogen, C_{1-14}alkyl, benzyl, phenethyl, 4-methylbenzyl, naphthylmethyl, phenyl, naphthyl, indanyl, C_{2-10}alkenyl, hydroxyl, protected hydroxyl, oxo, C_{1-14}alkylthio, nitro, cyano, amino, protected amino, C_{1-14}alkylamino, di-C_{1-14}alkylamino, C_{1-12}acyl, C_{1-12}acyl-C_{1-14}alkyl, carboxyl, protected carboxyl, carbamoyl, amino-C_{1-14}alkyl, N-C_{1-14} alkylamino-C_{1-14}alkyl, N,N-di-C_{1-14}alkylamino-C_{1-14}alkyl, hydroxy-C_{1-14}alkyl, hydroxyimino-C_{1-14}alkyl, C_{1-14}alkoxy-C_{1-14}alkyl, carboxy-C_{1-14}alkyl, C_{1-14}alkoxy-C_{1-14}alkyl, benzyloxycarbonyl-C_{1-14}alkyl, phenethyloxycarbonyl-C_{1-14}alkyl, 4-methylbenzyloxycarbonyl-C_{1-14}alkyl, naphthylmethyloxycarbonyl-C_{1-14}alkyl, sulfo-C_{1-14}alkyl, sulfo, sulfamoyl-C_{1-14}alkyl, sulfamoyl, carbamoyl-C_{1-14}alkyl, carbamoyl-C_{2-10}alkenyl and N-hydroxycarbamoyl-C_{1-14}alkyl; R^{10} represents an amino group or a protected amino group represented by the formula,



or by the formula,



in which R^{11}, R^{12}, R^{13}, R^{14} and R^{15}, which may be identical or different, are hydrogen atoms or C_{1-14}alkyl, C_{2-10}alkenyl, C_{3-7}cycloalkyl, C_{5-7}cycloalkenyl, phenyl, naphthyl, indanyl, benzyl, phenethyl, 4-methylbenzyl, naphthylmethyl, furyl, thienyl, pyrrolyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, thiadiazolyl, oxadiazolyl, thiatriazolyl, oxatriazolyl, triazolyl, tetrazolyl, pyridyl, 3-(2-methyl-4-pyrrolinyl), 3-(4-pyrrolinyl), N-(methylpiperidinyl), quinolyl, phenazinyl, 1,3-benzodioxolanyl, benzofuryl, benzothienyl, benzoxazolyl, benzthiazolyl, coumarinyl or acyl groups, which acyl can be derived from formic acid, acetic acid, propionic acid, butanoic acid, isobutanonic acid, pentanoic acid, methoxyacetic acid, methylthioacetic acid, acrylic acid, crotonic acid, cyclohexanoic acid, cyclopentaneacetic acid, cyclohexaneacetic acid, cyclohexanepropionic acid or cyclohexadieneacetic acid; and B represents a hydrogen atom or a C_{1-5}alkoxy group.

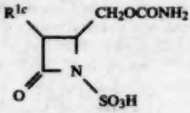
4,673,739

4-CARBAMOYLOXYMETHYL-1-SULFO-2-OXOAZETIDINE DERIVATIVES AND THEIR PRODUCTION

Taisuke Matsuo, deceased, late of Ibaraki, Japan (by Michiko Matsuo, heir); Michihiko Ochiai, Suita, and Shoji Kishimoto, Takarazuka, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Division of Ser. No. 499,801, May 31, 1983, Pat. No. 4,572,801, which is a continuation-in-part of Ser. No. 405,592, Aug. 5, 1982, which is a continuation-in-part of Ser. No. 326,938, Dec. 3, 1981.
This application Sep. 18, 1985, Ser. No. 778,219
Claims priority, application PCT Int'l Appl., Dec. 5, 1980, PCT/JP80/00297; Apr. 30, 1981, PCT/JP81/00103; Aug. 21, 1981, PCT/JP81/00183; Sep. 24, 1981, PCT/JP81/00252; Japan, Apr. 30, 1982, 57-73728; May 31, 1982, 57-93463
The portion of the term of this patent subsequent to Feb. 25, 2003, has been disclaimed.
Int. Cl.[4] C07D *205/08, 417/02;* A61K *31/425*
U.S. Cl. 540—355 11 Claims

1. A compound of the formula



wherein R^{1c} is amino or protected amino, or a base addition or acid addition salt or ester thereof.

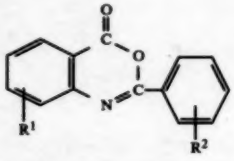
4,673,740

PREPARATION OF SUBSTITUTED 2-PHENYL-4H-3,1-BENZOXAZIN-4-ONES

Gerhard Hamprecht, Weinheim; Wolfgang Rohr, Wachenheim, and Juergen Varwig, Heidelberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

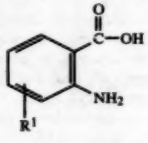
Filed Mar. 24, 1986, Ser. No. 842,995
Claims priority, application Fed. Rep. of Germany, Apr. 19, 1985, 3514183
Int. Cl.[4] C07D *265/36*
U.S. Cl. 544—92 4 Claims

1. In a process for the preparation of a 2-phenyl-4-H-3,1-benzozazin-4-one of the formula I



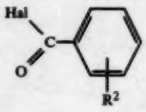
(I)

where R^1 is hydrogen, halogen, methyl or methoxy and R^2 is hydrogen, halogen or haloalkyl, haloalkoxy, haloalkylmercapto or haloalkylsulfonyl, each of 1 to 3 carbon atoms, by acylation of an antranilic acid II



(II)

with a benzoyl halide III



(III)

where Hal is halogen, in the presence of a base and effecting ring closure of the benzoyl anthranilate thus obtained by elimination of water, the improvement in the acylation step which comprises reacting the benzoyl halide III with

(a) a mixture of a stoichiometric amount of an at least 25% strength aqueous alkali metal hydroxide solution and a suspension of the anthranilic acid II in a suspending agent which is immiscible with the aqueous alkali metal hydroxide solution or

(b) a suspension of an alkali metal salt of anthranilic acid II in a suspending agent as defined under (a)

in the presence of a catlytically effective amount of a phase-transfer catalyst.

4,673,741

BIS-(2-ETHYLAMINO-4-DIETHYLAMINO-S-TRIAZINE-6-YL) TETRASULFIDE, PROCESS FOR ITS PRODUCTION, USE AND VULCANIZABLE MIXTURES CONTAINING IT

Werner Schwarze, Frankfurt am Main; Siegfried Wolff, Bornheim-Merten; Hans Remmel, Freigericht, and Horst Lambertz, Hürth, all of Fed. Rep. of Germany, assignors to Degussa AG, Frankfurt am Main, Fed. Rep. of Germany

Division of Ser. No. 693,343, Jan. 22, 1985, Pat. No. 4,621,121.
This application Apr. 22, 1986, Ser. No. 854,497
Int. Cl.[4] C07D *403/12*
U.S. Cl. 544—209 1 Claim

1. Bis-(2-ethylamino-4-diethylamino-s-triazin-6-yl)-tetrasulfide.

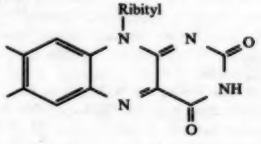
4,673,742

PREPARATION OF RIBOFLAVIN

Johannes Grimmer, Grenaa, Denmark, and Hans C. Horn, Lambsheim, Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

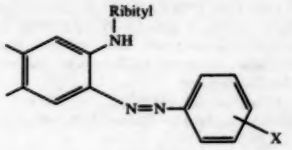
Filed Feb. 20, 1985, Ser. No. 703,523
Claims priority, application Fed. Rep. of Germany, Feb. 22, 1984, 3406819
Int. Cl.[4] C07D *487/02*
U.S. Cl. 544—251 5 Claims

1. An improved process for the preparation of riboflavin of formula I:

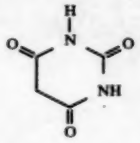


comprising:

condensing a 4,5-dimethyl-N-(D)-ribityl-2-phenylazoaniline of formula II:



wherein X is H, Cl, NO_2 or CH_3 in the o— or p-position, with barbituric acid of formula III:



in the presence of an acidic condensing agent in an organic solvent selected from the group consisting of ethylene glycol diacetate, butan-1,4-diol diacetate, glycerol triacetate, 1-methoxypropan-2-ol and ethoxy ethanol acetate or a mixture of these derivatives.

4,673,743

PROCESS FOR SEPARATING CAFFEINE FROM CAFFEINE-LOADED ACTIVE CARBON

Jochen Wilkens, Bremen, Fed. Rep. of Germany, assignor to Hag GF Aktiengesellschaft, Bremen, Fed. Rep. of Germany

Filed Mar. 24, 1986, Ser. No. 842,848
Int. Cl.[4] C07D *473/12*
U.S. Cl. 544—275 **9 Claims**

1. A process for separating caffeine from caffeine-loaded active carbon comprising: (1) passing an inert gas stream at temperatures from about 350° C. to about 450° C. rectangularly through said caffeine-loaded active carbon which desorbs said caffeine from said active carbon; (2) precipitating said caffeine by quenching said caffeine containing inert gas stream.

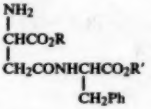
4,673,744

METHOD FOR CONVERSION OF β-ASPARTYLPHENYLALANINE DERIVATIVES TO α-ASPARTYLPHENYLALANINE DERIVATIVES

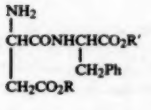
Kunio Hisamitsu, Funabashi; Tadashi Takemoto; Toshihide Yukawa, both of Yokohama, all of Japan, and Kunio Hisamitsu, Funabashi, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed May 1, 1986, Ser. No. 857,978
Claims priority, application Japan, Jun. 4, 1985, 60-121124
Int. Cl.[4] C07D *24/08*
U.S. Cl. 544—385 **3 Claims**

1. A method for converting β-aspartylphenylalanine derivative (1) to α-aspartylphenylalanine derivatives (2) and (3), said derivatives having the following structures:

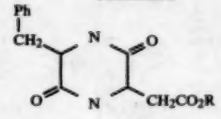


1



2

-continued



3

which comprises:

reacting said β-aspartylphenylalanine derivative (1) at a temperature of from 0° to 200° C. for a time period of from 30 minutes to 80 hours, in a C_1 to C_4 alcohol solvent with or without stirring, wherein R and R' represent hydrogen or an alkyl group having from 1 to 4 carbon atoms.

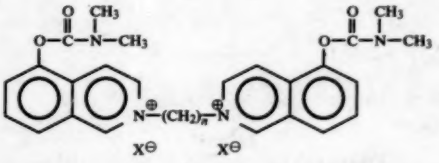
4,673,745

ISOQUINILINIUM CHEMICAL AGENTS

Harold Z. Sommer, Havre de Grace; Omer O. Owens, Abingdon, and Jacob I. Miller, Baltimore, all of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jun. 29, 1966, Ser. No. 562,946
Int. Cl.[4] C07D *413/00*
U.S. Cl. 546—147 **6 Claims**

1. New chemical toxic agents, the compounds having the formula:



where n is 3 to 16 carbon atoms and where X is one equivalent of a monovalent or polyvalent anion selected from the group of anions consisting of halide, hydrogen sulfate, hydrogen oxalate, nitrate, perchlorate, and tetraphenylboronate.

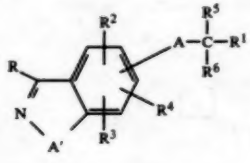
4,673,746

1,2-BENZISOXAZOLOXYACETIC ACIDS AND RELATED COMPOUNDS

Gregory M. Shutske, Nauheim, Fed. Rep. of Germany; Linda L. Setescak, Somerville, and Richard C. Allen, Flemington, both of N.J., assignors to Hoechst-Roussel Pharmaceuticals, Inc., Bridgewater, N.J.

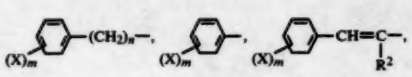
Continuation-in-part of Ser. No. 949,128, Oct. 6, 1978, abandoned, which is a continuation-in-part of Ser. No. 853,213, Nov. 21, 1977, abandoned. This application Oct. 27, 1980, Ser. No. 201,083
Int. Cl.[4] C07D *261/20, 275/04*; A61K *31/42, 31/425*
U.S. Cl. 546—272 **114 Claims**

1. A compound depicted by the formula



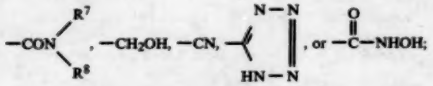
wherein

R is naphthyl,



thienyl, furyl, pyrryl, pyridyl, or pyridyl N-oxide;

R^1 is a free or esterified carboxyl group of 1 to 8 carbon atoms,



R^2, R^3 and R^4 are the same or different and each can be hydrogen, halogen, or loweralkyl of 1 to 4 carbon atoms;

X is hydrogen, halogen, loweralkyl of 1 to 4 carbon atoms, loweralkoxy of 1 to 4 carbon atoms, loweralkylthio of 1 to 4 carbon atoms, hydroxy, trifluoromethyl, nitro, amino or acylamino;

R^5, R^6, R^7, and R^8 are the same or different and can be hydrogen or loweralkyl of 1 to 4 carbon atoms;

A and A′ are the same or different and can be O or S; and

m and n are the same or different and each can be the integer 1, 2 or 3;

or a physiologically acceptable salt thereof.

4,673,747

AMINOALKYLPHENOXY DERIVATIVES

Fujio Nohara, Takaoka, and Tomoaki Fujinawa, Toyama, both of Japan, assignors to Ikeda Mohando Co., Ltd., Nakanlikawa, Japan

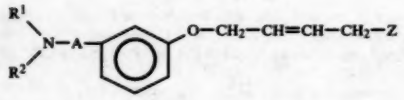
Continuation-in-part of Ser. No. 737,489, Mar. 24, 1985, Pat. No. 4,639,523. This application Dec. 3, 1985, Ser. No. 804,148

Claims priority, application Japan, Jun. 1, 1984, 59-112746

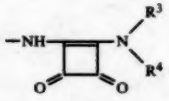
Int. Cl.⁴ C07D *401/12, 207/09, 211/22, 205/04*

U.S. Cl. 546—334 **8 Claims**

1. An aminoalkylphenoxy derivative having the formula:



wherein R^1 and R^2 are individually hydrogen atoms or lower alkyl groups having 1 to 4 carbon atoms, or R^1 and R^2 form, together with the bonded nitrogen atom, a 4- to 8-member heterocyclic ring, which is unsubstituted or substituted by a lower alkyl group having one to four carbon atoms; A is a straight-chain or branched-chain alkylene group having one to four carbon atoms; and Z is a moiety of the formula:



wherein R^3 and R^4 are each hydrogen, or lower alkyl groups having 1 to 6 carbon atoms, or propenyl, propargyl or pyridylmethyl groups; or a pharmaceutically acceptable salt thereof.

4,673,748

PROCESS FOR PREPARING 2-OXAZOLINES UTILIZING STANNOUS SALTS OF CARBOXYLIC ACIDS

Kenneth Rock, Halesowen, and Geoffrey Smith, Quarry Bank, both of England, assignors to Robinson Brothers Limited, West Midlands, England

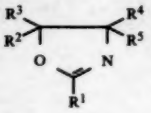
Filed Apr. 30, 1985, Ser. No. 728,892

Claims priority, application United Kingdom, May 10, 1984, 8411928

Int. Cl.⁴ C07D *263/08*

U.S. Cl. 548—237 **8 Claims**

1. A process for preparing an oxazoline of the formula (II):



(II)

where R^1 is hydrogen, an alkyl, or a phenyl (C_{1-6}) alkyl group and R^2, R^3, R^4 and R^5 are independently hydrogen or an alkyl group having from 1 to 4 carbon atoms by cyclodehydrating a hydroxyamide of the formula:

$$R^1CONHCR^2R^3CR^4R^5OH$$

in the presence of a metal salt of a carboxylic acid as catalyst, in which the salt is a stannous salt.

4,673,749

PROCESS FOR PRODUCING AN INDOLINE

Michio Morinaga; Akira Ikeda, and Akira Shinohara, all of Shimizu, Japan, assignors to Ihara Chemical Industry Co., Ltd., Tokyo, Japan

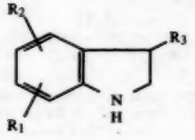
Filed May 7, 1985, Ser. No. 731,393

Claims priority, application Japan, May 10, 1984, 59-93677

Int. Cl.⁴ C07D *209/08, 209/12, 209/14*

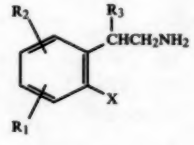
U.S. Cl. 548—490 **7 Claims**

1. A process for producing an indoline of the formula:



(I)

wherein R_1 is a hydrogen atom, a lower alkyl group, a lower alkoxy group, a nitro group or a hydroxyl group, R_2 is a hydrogen atom, a lower alkoxy group or a nitro group, and R_3 is a hydrogen atom, a lower alkyl group or a lower alkyl group substituted by hydroxyl, amino, nitrile or alkoxy, by a cyclization reaction of a 2-halogenophenethylamine of the formula:



(II)

wherein R_1, R_2 and R_3 are as defined above, and X is a halogen atom, in the presence of a copper type catalyst and a dehydrohalogenating agent, characterized in that copper bis(8-hydroxyquinolinolate) is used as the copper type catalyst, and an aqueous alkali is used as the dehydrohalogenating agent.

4,673,750

AUTO-ADHERING ONE-COMPONENT RTV SILICONE SEALANT COMPOSITION UTILIZING GLYCIDOXYALKYL SUBSTITUTED ALKOXY-OXIME SILANE AS AN ADHESION PROMOTER

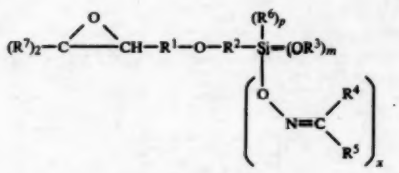
M. Dale Beers, Aurora, and James E. Thompson, Lakewood, both of Ohio, assignors to Loctite Corporation, Newington, Conn.

Continuation of Ser. No. 719,753, Apr. 4, 1985, abandoned. This application Apr. 27, 1986, Ser. No. 869,452

Int. Cl.⁴ C07D *303/02*; C07F *7/10*

U.S. Cl. 549—215 **7 Claims**

1. An adhesion promoter, comprising: A compound having the formula:



wherein R^1 is hydrocarbyl, or halohydrocarbyl having from 1 to 10 carbon atoms; R^2 is a divalent hydrocarbyl, or a halohydrocarbyl having from 1 to 10 carbon atoms; R^3 is a hydrocarbyl, a halohydrocarbyl, or a carboxyalkyl having from 1 to 10 carbon atoms; m is from 0 to 2, R^4 and R^5 is independently a hydrocarbyl, halohydrocarbyl or carboxyalkyl having from 1 to 10 carbon atoms; x is 1 to 3; R^6 is hydrocarbyl, a halohydrocarbyl, or a carboxyalkyl having from 1 to 10 carbon atoms; p is 0–2; and the R^7 groups are independently hydrogen, hydrocarbyl, halohydrocarbyl, or carboxyalkyl having from 1 to 10 carbon atoms; and x+m+p=3.

4,673,751

METHOD OF PREPARING 3,4-DIHYDRO-ALPHA-PYRONES

Klaus-Dieter Steffen, Hennef, and Günther Meyer, Troisdorf, both of Fed. Rep. of Germany, assignors to Dynamit Nobel AG, Troisdorf, Fed. Rep. of Germany

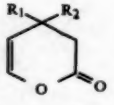
Filed Nov. 21, 1984, Ser. No. 673,921

Claims priority, application Fed. Rep. of Germany, Nov. 25, 1983, 3342598

Int. Cl.⁴ C07D *309/32*

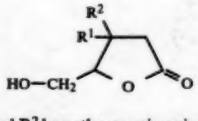
U.S. Cl. 549—294 **4 Claims**

1. A method of preparing 3,4-dihydro-alpha-pyrones of the general formula



(I)

in which R^1 and R^2 represent low alkyl moieties of 1 to 4, or hydrogen, by heating 5-hydroxymethyl-gamma-butyrolactones of formula II



(II)

in which R^1 and R^2 have the meaning given above, comprising heating the 5-hydroxymethyl-gamma-butyrolactones in a liquid heat transfer oil at temperatures between 300° and 400° C. in the presence of a zeolite catalyst, said liquid heat transfer oil being a polynuclear aromatic compound wherein the aromatic groups are linked to one another directly or through a grouping selected from the group consisting of $—CH_2—$, —O—, $—SO_2—$, or $OSiR_2O$, R being alkylene, said liquid heat transfer oil having a boiling point above 200° C. and remaining liquid during the heating; distilling the 3,4-dihydro-alpha-pyrone out of the reaction medium immediately upon its formation; and feeding the butyrolactone (II) into the liquid heat transfer oil in the measure in which the pyrone (I) is distilled out.

4,673,752

AMINOACYLLABDANES

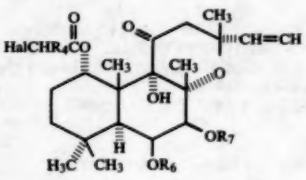
Raymond W. Kosley, Jr., Bridgewater, and Robert J. Cherill, Somerset, both of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Division of Ser. No. 804,405, Dec. 4, 1985, Pat. No. 4,639,446, which is a continuation-in-part of Ser. No. 681,779, Dec. 14, 1984, abandoned. This application Oct. 20, 1986, Ser. No. 921,024

Int. Cl.⁴ C07D *311/92*

U.S. Cl. 549—389 **2 Claims**

1. A compound of the formula



wherein R_4 is hydrogen, loweralkyl or benzyl; R_6 is hydrogen or a group of the formula R_5CO wherein R_5 is hydrogen or loweralkyl; R_7 is hydrogen or a group of the formula R_8CO wherein R_8 is hydrogen or loweralkyl; Hal is chloro or bromo; or the optical and geometric isomers thereof.

4,673,753

RHODIUM OXYMETALLATE CATALYSTS

Allen R. Siedle, Lake Elmo, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 3, 1986, Ser. No. 825,663

Int. Cl.⁴ C07F *15/00*

U.S. Cl. 556—15 **14 Claims**

1. A compound having one of the formulae:

$$[(aryl_3P)_2\,Rh(CO)(alkylCN)]_{8-n}X^{+n}M_{12}O_{40}, \quad \text{I}$$

$$[(aryl_3P)_2Rh(CO)(alkylCN)]_{9-N}X^{+n}M_{12}O_{40}, \quad \text{II}$$

$$[(aryl_3P)_2Rh(CO)]_{8-n}X^{+n}M_{12}O_{40}, \quad \text{III}$$

$$[(aryl_3P)_2Rh(CO)]_{9-n}X^{+n}M_{12}O_{40}, \quad \text{IV}$$

$$[(aryl_3P)_2Rh(CO)_3]_{8-n}X^{+n}M_{12}O_{40}, \text{ and} \quad \text{V}$$

$$[(aryl_3P)_2Rh(CO)_3]_{9-n}X^{+n}M_{12}O_{40}, \quad \text{VI}$$

wherein

alkyl is lower alkyl (C_1 to C_4),

X is an element selected from the group consisting of Periodic Table groups IIIA, IVA, VA, and VIII,

M is a molybdenum (Mo) or tungsten (W), aryl is phenyl or phenyl substituted by 1 to 3 lower alkyl or alkoxy groups, and

n is an integer having a value 2 to 5.

4,673,754

PLATINUM AND PALLADIUM COMPLEXES

Gaylord D. Smith, Ramsey, N.J.; Douglas S. Brown, Tuxedo, N.Y.; Philip Bernstein, Glen Ridge, N.Y., and John E. Weller, Walden, N.Y., assignors to Inco Alloys International, Inc., Huntington, W. Va.

Division of Ser. No. 540,871, Oct. 14, 1983, which is a continuation-in-part of Ser. No. 440,449, Nov. 10, 1982, abandoned. This application Mar. 21, 1986, Ser. No. 842,140

Int. Cl.[4] C07F 15/00

U.S. Cl. 556—137 6 Claims

1. Lyophilized compositions of matter comprising initially water soluble anionic polysaccharides having anionic functional groups thereon and having at least part of the valence requirements of said anionic functional groups satisfied by a moiety of square planar coordination having the formula cis[MLL']++ wherein M is a metal species selected from the group of divalent platinum and divalent palladium and L and L' are selected from the group of ammonia and mono and difunctional primary amines.

4,673,755

NONREACTIVE CLASS OF SURFACTANTS FOR FOAMING AGENTS IN PLASTICS

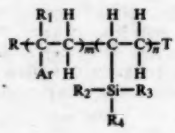
Gregory K. Rickle, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jul. 25, 1985, Ser. No. 758,944

Int. Cl.[4] C07F 7/08

U.S. Cl. 556—489 7 Claims

1. A compound of the following general formula



wherein Ar is selected from the group consisting of phenyl, alkyl substituted phenyl, naphthyl alkyl substituted alkyl groups wherein the alkyl substitution contains from 1 to 20 carbon atoms;

R is an alkyl radical containing 1–10 carbon atoms;

R_1 is hydrogen or methyl;

R_2, R_3, and R_4 are individually selected from the group consisting of alkyl and cycloalkyl groups varying from 1–10 carbon atoms, phenyl and alkyl or cyclo alkyl substituted phenyl;

m and n vary independently among the positive integers; and

T is the radical obtained from chain termination.

4,673,756

NEMATIC LIQUID CRYSTALLINE COMPOUNDS

Makoto Sasaki, Okegawa; Haruyoshi Sasaki, Kodaira, and Hisato Sato, Tokyo, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

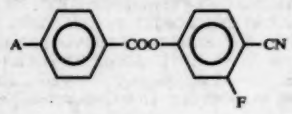
Division of Ser. No. 546,534, Oct. 28, 1983, Pat. No. 4,551,280. This application Jun. 17, 1985, Ser. No. 744,978

Claims priority, application Japan, Oct. 30, 1982, 57-191063; Mar. 18, 1983, 58-44329; Mar. 18, 1983, 58-442330

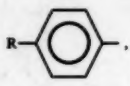
Int. Cl.[4] C09K 19/12; G02F 1/13; C07C 121/75

U.S. Cl. 558—416 4 Claims

1. A compound of the general formula



wherein A denotes a substituted ring structure represented by the formula



the substituent R denotes a linear alkyl group having 1 to 9 carbon atoms.

4,673,757

PROCESS FOR SELECTIVE HYDROGENATION OF C-C DOUBLE BONDS IN THE PRESENCE OF REDUCIBLE, NITROGEN-CONTAINING GROUPS AND NEW RUTHENIUM COMPLEX COMPOUNDS

Paul Fiedler, Cologne; Rudolf Braden, Odenthal, and Hartmuth Buding, Dormagen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 11, 1984, Ser. No. 659,591

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1983, 3337294

Int. Cl.[4] C07C 121/16, 121/20, 131/02, 131/00

U.S. Cl. 558—431 11 Claims

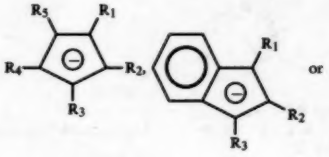
1. A process for selectively catalytically hydrogenating a carbon-carbon double bond in a compound possessing a reducible nitrogen-containing group which comprises contacting said compound in liquid phase with hydrogen in the presence of a catalytically active ruthenium complex which corresponds to the formula

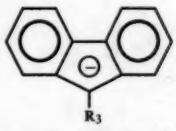
$$RuXL_1(L_2)_2$$

in which

X represents chlorine, bromine, iodine or hydrogen,

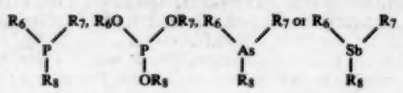
L_1 represents an aromatic ligand of the formula





in which

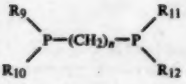
R_1 to R_5 can be identical or different and represent hydrogen, methyl, ethyl or phenyl and L_2 represents a ligand of the formula



in which

R_6, R_7 and R_8 can be identical or different and denote alkyl, cycloakyl or alkyl or cycloalkyl substituted by hydroxyl, alkoxy, carbalkoxy or halogen groups or aryl, aralkyl or aryl or aralkyl substituted by alkyl, hydroxyl, alkoxy, carbalkoxy or halogen groups or

$(L_2)_2$ represents a bidentate bisphosphane ligand of the formula



in which

n represents an integer from 1 to 10 and the radicals R_9, R_{10}, R_{11} and R_{12} can be identical or different and denote alkyl, cycloalkyl or alkyl or cycloalkyl substituted by hydroxy, alkoxy, carbalkoxy or halogen groups or aryl, aralkyl or aryl or aralkyl substituted by alkyl, hydroxyl, alkoxy, carbalkoxy or halogen groups wherein the compound to be catalytically selectively hydrogenated is selected in the group consisting of alkene-nitriles having 2 to 20 carbon atoms in the alkene portion, alkene-dinitriles having 2 to 20 carbon atoms in the alkene portion, alkene-carbaldoximes having 2 to 20 carbon atoms in the alkene portion, cycloalkene-nitriles having 5 to 12 carbon atoms in the cycloalkene portion, cycloalkene-carbaldoximes having 5 to 12 carbon atoms in the cycloalkene portion, cycloalkene-carbaldimines having 5 to 12 carbon atoms in the the cycloalkene portion and nitroarylalkenes of of 5 to 12 carbon atoms.

4,673,758

UNSATURATED POLYESTERS

Jürgen Meixner, Krefeld; Manfred Müller, Erkelenz, and Wolfgang Kremer, Kerken, all of Fed. Rep. of Germany, assignors to Baker Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 31, 1985, Ser. No. 793,227

Claims priority, application Fed. Rep. of Germany, Nov. 10, 1984, 3441154

Int. Cl.[4] C07C *69/76, 69/593*

U.S. Cl. 560—90 **6 Claims**

1. Unsaturated polyester with acid numbers of from 5 to 50 and viscosities, determined in the Höppler drop-ball viscosimeter at 20° C. of from 5000 to 30000 mPa.s containing cocondensed radicals of

(A) from 0.5 to 1 mol of at least one α,β-ethylenically unsaturated dicarboxylic acid, and

(B) from 0 to 0.5 mol of one or more aliphatic, saturated dicarboxylic acids, one or more cycloaliphatic, saturated or unsaturated and/or aromatic dicarboxylic acids having from 8 to 12 carbon atoms, one or more araliphatic dicarboxylic acids having from 9 to 14 carbon atoms, or mixtures thereof,

whereby the sum of the components A and B is in each case made up to 1 mol,

(C) at least one dihydric aliphatic saturated alcohol,

(D) trimethylolpropane diallyl ether,

(E) optionally one or more monohydric aliphatic saturated, cycloaliphatic or aromatic alcohols, and

(F) at least one poly-C_2-C_4-alkylene glycol,

characterised in that per mol A + B, the quantities of the radicals of the component C are from 0.4 to 0.7 mol, of the component D from 0.4 to 1 mol and of the component E from 0 to 0.6 mol, with the proviso that the sum of the radicals of components D and E is 1 mol, that the cocondensed radicals of the component F have a molecular weight, determined as number average, of from 1000 to 2000 and are present in a quantity of from 10.5 to 13.5% by weight, based on the unsaturated polyester.

4,673,759

PROCESS FOR THE PREPARATION OF 2-ALKYL CYCLOPENT-2-ENONES

Enrico Dalcanale, Novara, Italy, assignor to Montedison S.p.A., Milan, Italy

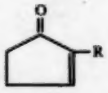
Filed Mar. 3, 1986, Ser. No. 835,246

Claims priority, application Italy, Mar. 5, 1985, 19770 A/85

Int. Cl.[4] C07C *67/30*

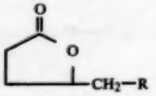
U.S. Cl. 560—122 **9 Claims**

1. A process for the preparation of a 2-alkylcyclopenten-2-one having formula:



(I)

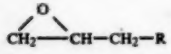
where R is C_nH_{2n+1} (linear or branched); $(CH_2)_n$—COOR'; $(CH_2)_n$—NR'2; $(CH_2)_n$—OR'; $(CH_2)_n$X or $(CH_2)_n$—CN, n ranges from 1 to 20, X is Cl, Br, I or F, and R' is an alkyl group containing up to 5 carbon atoms, a benzyl group, or a phenyl group, the last two groups having optionally one or more substituent groups on the ring, wherein a saturated gamma-alkyl-lactone:



(V)

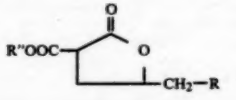
is reacted at 20°–100° C. with a protic acid, thereby obtaining, by rearrangement, a 2-alkyl-cyclopenten-2-one (I), characterized in that said gamma-alkyl-lactone (V) is obtained through the following steps:

(a) an epoxide:



(III)

is made to react with an alkylating agent having the formula $Na^+[CH(COOR'')_2]^-$ (R'' being an ethyl, isopropyl or isobutyl radical), in the presence of the malonic ester COOR''—CH_2—COOR'' and of an alcoholic solvent R''OH, the alkylating agent being in substantially equimolar ratio with respect to said epoxide and the malonic ester being in a molar ratio, with respect to said epoxide, of from 0.5 to 2, an alpha-carbalkoxy-gamma-alkyl-lactone being thus obtained having the formula:



(IV)

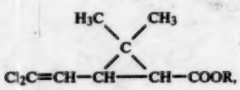
(b) said carbalkoxy-alkyl-lactone (IV) is saponified in an alkaline medium, thereby obtaining the corresponding acid, and such acid is decarboxylated, at 100°–160° C., thereby obtaining a gamma-alkyl-lactone having formula (V).

4,673,760
PROCESS FOR THE PREPARATION OF VINYLCYCLOPROPANECARBOXYLIC ACID DERIVATIVES

Hans-Georg Schmidt, Niederkassel, Fed. Rep. of Germany, assignor to Dynamit Nobel AG, Troisdorf Bez Koeln, Fed. Rep. of Germany

Filed Sep. 20, 1985, Ser. No. 778,458
Claims priority, application Fed. Rep. of Germany, Sep. 21, 1984, 3434615
Int. Cl.[4] C07C *69/743*
U.S. Cl. 560—124 5 Claims

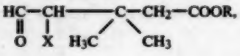
1. A process for the preparation of cis-trans isomer mixtures of 2,2-dimethyl-3(β,β-dichlorovinyl)-cyclopropane-1-carboxylic acid esters of formula I, which contain more than 50% of the cis isomer,



(I)

wherein R is an alkyl moiety of 1 to 6 carbon atoms, characterized in that

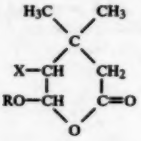
(a) a pentanoic acid ester of formula II



(II)

in which X is chlorine or bromine and R has the meaning given above, or

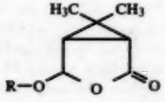
(b) a 4,4-dimethyl-5-halogen-6-alkoxy-tetrahydropyrone of formula III



(III)

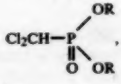
in which X and R have the meaning given above, or

(c) a lactone of formula IV



(IV)

in which X and R have the meaning above, is reacted with a basic compound in the presence of a dichlorophosphonic acid ester of the formula



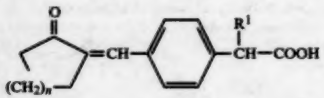
in which R has the meaning given above.

4,673,761
PROCESS FOR PREPARING ANTI-INFLAMMATORY CYCLOALKYLIDENEMETHYLPHENYLACETIC ACID DERIVATIVES

Atsusuke Terada, and Kazuyuki Wachi, both of Tokyo, Japan, assignors to Sankyo Company, Limited, Tokyo, Japan

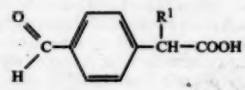
Filed Jun. 28, 1985, Ser. No. 750,481
Claims priority, application Japan, Jul. 10, 1984, 59-142567
Int. Cl.[4] C07C *59/86*
U.S. Cl. 562—459 45 Claims

1. A process for preparing a compound of formula (I):



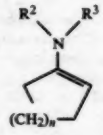
(I)

wherein R^1 represents a hydrogen atom or a C_1–C_4 alkyl group and n is an integer of from 1 to 3, which process comprises reacting a benzaldehyde acid compound of formula (II):



(II)

in which R^1 is as defined above with an enamine derivative of formula (III):



(III)

in which:

n is as defined above; and

R^2 and R^3 are independently selected from the group consisting of C_1–C_6 alkyl groups, or R^2 and R^3, together with the nitrogen atom to which they are attached, represent a cyclic amino group, of which the remaining ring atoms are selected from the group consisting of carbon, nitrogen, oxygen and sulfur atoms,

and then hydrolizing the product of this reaction to give said compound of formula (I).

4,673,762
DECOLORIZING ETHANOLAMINES WITH ALKYLENE OXIDES

James H. Paslean, Port Neches, and Charles S. Steele, Nederland, both of Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed May 27, 1986, Ser. No. 866,676
Int. Cl.[4] C07C *85/26*
U.S. Cl. 564—497 3 Claims

1. A method for decolorizing monoethanolamine, diethanolamine or triethanolamine comprising:

adding an alkylene oxide selected from the group consisting of ethylene oxide, propylene oxide and mixtures thereof.

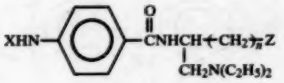
4,673,763

ALPHA-FUNCTIONALIZED DERIVATIVES AND LABELED CONJUGATES OF PROCAINAMIDE AND NAPA

Robert T. Buckler, Edwardsburg, Mich., and Frederick E. Ward, Elkhart, Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Division of Ser. No. 455,223, Jan. 3, 1983. This application Mar. 18, 1985, Ser. No. 713,041
Int. Cl.[4] C12N *9/96*
U.S. Cl. 564—155 **5 Claims**

1. A compound of the formula:



wherein X is hydrogen or acetyl, n is an integer from 1 through 10, and Z is carboxyl or amino.

4,673,764

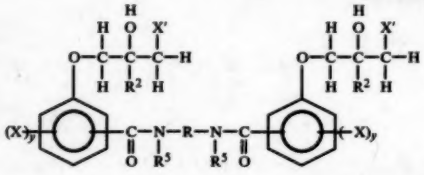
EPOXY RESINS FROM HYDROXY BENZAMIDES

James L. Bertram, Lake Jackson, Tex., and Edmund P. Woo, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

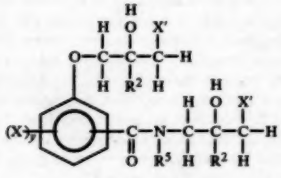
Division of Ser. No. 240,742, Mar. 6, 1981, Pat. No. 4,367,328. This application May 13, 1982, Ser. No. 377,659
Int. Cl.[4] C07C *103/20*
U.S. Cl. 564—155 **3 Claims**

1. A product resulting from reacting (1) a composition containing a vicinal dihydroxy-containing material or mixture of such materials represented by any one of the following formulas VIII, IX or X

FORMULA VIII



FORMULA IX



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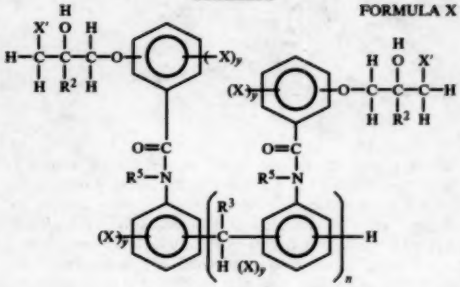
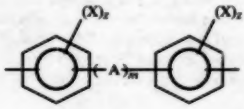
FORMULA X

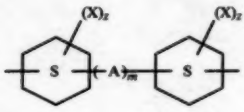


wherein each R is a divalent hydrocarbyl group having from 1 to about 18 carbon atoms, a group represented by the following formulas IV, V, VI or VII

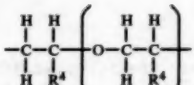
FORMULA IV



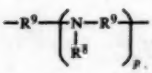
FORMULA V



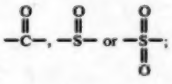
FORMULA VI



FORMULA VII

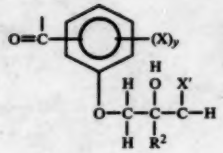


or R can be combined with R^5 so as to form a stable heterocyclic ring with the nitrogen atoms; each A is independently a divalent hydrocarbyl group having from 1 to about 10 carbon atoms, —O—, —S—, —S—S—,



each R^2 and R^3 is independently hydrogen or an alkyl group having from 1 to about 4 carbon atoms; each R^4 is independently hydrogen, a hydrocarbyl or a halogen substituted hydrocarbyl group having from 1 to about 8 carbon atoms; each R^5 is independently hydrogen, a 2-hydroxy-3-halopropyl group, a 2-alkyl-2-hydroxy-3-halopropyl group, a monovalent hydrocarbyl group or a hydroxyl substituted monovalent hydrocarbyl group, said hydrocarbyl groups having from 1 to about 9 carbon atoms, said alkyl group having from 1 to about 4 carbon atoms; each R^8 is independently selected from the group represented by the following formula XV

FORMULA XV



or the groups represented by R^5, except that R^8 cannot be hydrogen; each R^9 is a divalent hydrocarbyl group having from 2 to about 4 carbon atoms; each X is independently hydrogen, chlorine, bromine or a hydrocarbyl or hydrocarbyloxy group having from 1 to about 9 carbon atoms; each X' is a hydroxyl group; each m independently has a value of zero or 1; n has an average value of from about 0.01 to about 6; p has an average value of from 1 to about 10; q has an average value of at least 1 and each y and z independently has a value of 1 or 2 with (2) a vicinal monoepoxy-containing material.

2. A product of claim 1 wherein in said vicinal dihydroxyl-containing material each R is independently a divalent hydrocarbyl group having from 2 to about 12 carbon atoms or two such groups each having from 2 to about 4 carbon atoms; A is a divalent hydrocarbyl group having from 1 to about 4 carbon atoms, each R^2, R^3, R^5 and X is hydrogen; R^4 is hydrogen or an alkyl group having from 1 to about 2 carbon atoms; R^9 is a divalent hydrocarbyl group having 2 carbon atoms; and m has a value of 1.

4,673,765

EPOXY RESINS FROM HYDROXY BENZAMIDES

James L. Bertram, Lake Jackson, Tex., and Edmund P. Woo, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

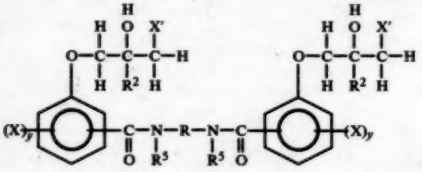
Division of Ser. No. 240,742, Mar. 5, 1981, Pat. No. 4,367,328. This application May 13, 1982, Ser. No. 377,660

Int. Cl.[4] C07C *103/20*

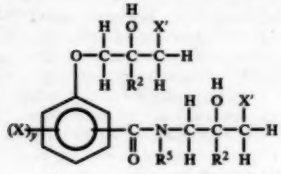
U.S. Cl. 564—155 **2 Claims**

1. A halohydrin or mixture of halohydrins represented by any one of the following formulas VIII, IX or X

FORMULA VIII



FORMULA IX



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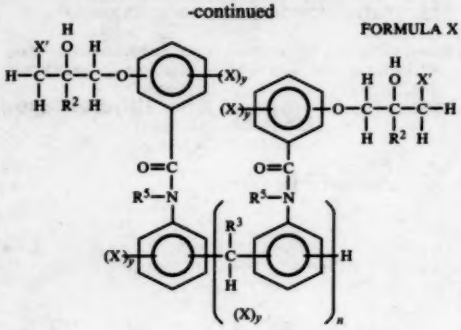
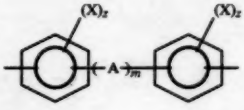
FORMULA X

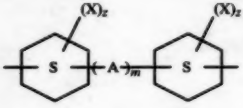


wherein each R is a divalent hydrocarbyl group having from 1 to about 18 carbon atoms, a group represented by the following formulas IV, V, VI or VII

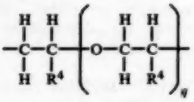
FORMULA IV



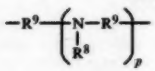
FORMULA V



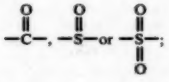
FORMULA VI



FORMULA VII

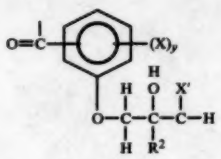


or R can be combined with R^5 so as to form a stable heterocyclic ring with the nitrogen atoms; each A is independently a divalent hydrocarbyl group having from 1 to about 10 carbon atoms, —O—, —S—, —S—S—,



each R^2 and R^3 is independently hydrogen or an alkyl group having from 1 to about 4 carbon atoms; each R^4 is independently hydrogen, a hydrocarbyl or a halogen substituted hydrocarbyl group having from 1 to about 8 carbon atoms; each R^5 is independently hydrogen, a 2-hydroxy-3-halopropyl group, a 2-alkyl-2-hydroxy-3-halopropyl group, a monovalent hydrocarbyl group or a hydroxyl substituted monovalent hydrocarbyl group, said hydrocarbyl groups having from 1 to about 9 carbon atoms, said alkyl group having from 1 to about 4 carbon atoms; each R^8 is independently selected from the group represented by the following formula XV

FORMULA XV



or the groups represented by R^5, except that R^8 cannot be hydrogen; each R^9 is a divalent hydrocarbyl group having from 2 to about 4 carbon atoms; each X is independently hydrogen, chlorine, bromine or a hydrocarbyl or hydrocarbyloxy group having from 1 to about 9 carbon atoms; each X' is independently a halogen atoms; each m independently has a value of zero or 1; n has an average value of from about 0.1 to about 6; p has an average value of from 1 to about 10; q has an average value of at least 1 and each y and z independently has a value of 1 or 2.

4,673,766

METHOD OF PRODUCING BENZALDEHYDE

Keith T. Buck; Anthony J. Boeing, and Joseph E. Dolfini, all of Cincinnati, Ohio, assignors to Mallinckrodt, Inc., St. Louis, Mo.

Filed Apr. 25, 1986, Ser. No. 856,595
Int. Cl.[4] C07C 45/51
U.S. Cl. 568—433 **8 Claims**

1. A method of making benzaldehyde com- prising

dispersing cinnamaldehyde in water,

converting the cinnamaldehyde to benzaldehyde under the action of heat in the presence of a catalytic amount of hydroxide ion and at a pH of about 11 to about 13,

fractionally steam distilling benzaldehyde and acetaldehyde from the cinnamaldehyde, and

recovering benzaldehyde from the distillate.

4,673,767

AMS-1B CRYSTALLINE BOROSILICATE MOLECULAR SIEVE-BASED CATALYST COMPOSITIONS AND PROCESS FOR TOLUENE ALKYLATION

Tayseer S. Nimry, Glen Ellyn, and Richard E. De Simone, Lisle, both of Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Nov. 25, 1985, Ser. No. 801,471
Int. Cl.[4] C07C 2/68
U.S. Cl. 585—467 **12 Claims**

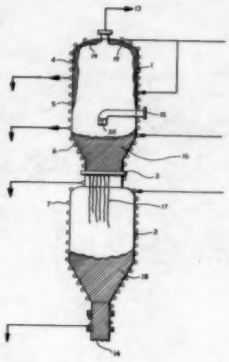
1. A process for making ethyltoluene by reacting ethylene with toluene in the presence of a catalyst composition comprising a HAMS-1B crystalline borosilicate molecular sieve incorporated into an inorganic matrix, said composition (1) impregnated by a magnesium compound and subsequently heated to substantially convert said compound to the oxide form and (2) containing between about 4 and about 25% by weight magnesium.

4,673,768

SEPARATION OF POLYMER FROM HYDROCARBON SOLVENT IN THE MANUFACTURE OF POLYMERS OF ETHYLENE

John N. Yeates, Sarnia, Canada, assignor to Du Pont Canada Inc., Mississauga, Canada

Filed Mar. 7, 1986, Ser. No. 837,162
Int. Cl.[4] C10C 2/00
U.S. Cl. 585—519 **11 Claims**



1. In a solution process for the manufacture of polymers of ethylene selected from the group consisting of homopolymers of ethylene and copolymers of ethylene and higher α-olefins, a process for the separation of a solution comprising α-olefin polymer and inert hydrocarbon solvent into fractions comprising said polymer and said solvent, said solution being at a temperature above 130° C. and at a pressure above atmospheric pressure, wherein pressure of said solution is reduced by passing said solution through pressure reduction means and into a substantially vertical elongated vessel, such that the solution passes into the vessel in a downward direction, said polymer forming a pool of molten polymer below said pressure reduction means and said solvent passing in a form of a vapour from the top of said vessel, the walls of said vessel being maintained at a temperature above the melting point of the polymer, the improvement comprising maintaining the walls of the vessel in the region above said pressure reduction means at a temperature that is at least 10° C. higher than the temperature of the remainder of the walls of the vessel.

4,673,769

COMPOSITE CATALYST FOR HYDROCARBON CONVERSION REACTIONS

Dan Farcasiu, Flemington, N.J., assignor to Exxon Research and Engineering Company, Florham Park, N.J.

Division of Ser. No. 705,988, Feb. 27, 1985, Pat. No. 4,585,750, which is a continuation-in-part of Ser. No. 563,818, Dec. 21, 1983, abandoned. This application Dec. 13, 1985, Ser. No. 808,659
Int. Cl.[4] C07C 2/66
U.S. Cl. 585—458 **5 Claims**

1. A process for the alkylation or aromatic hydrocarbons by olefins which comprises contacting the aromatic and the olefin in the presence of a catalyst composite comprising a perfluorinated polymersulfonic acid and an ion stabilizing agent selected from the group consisting of C_2–C_6 fluorinated carboxylic acids and alcohols.

4,673,770

GLASS SEALED SILICON MEMBRANE SOLAR CELL

Joseph Mandelkorn, Peretz 5, Rehovot, Israel

Filed Oct. 21, 1985, Ser. No. 789,446
Int. Cl.[4] H01L *31/06, 31/18*
U.S. Cl. 136—259 16 Claims

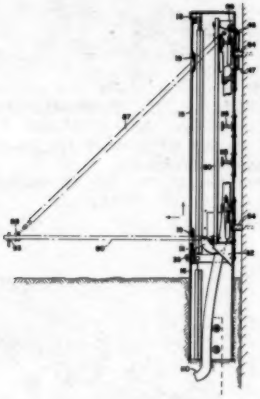
1. An improved silicon back surface field solar cell comprising a high quality very thin silicon single crystal wafer base 0.0005 to about 0.0004 inch thick, said base containing a back surface field region of the same type, P or N, as said base, said back surface field region having a thickness of about 1 μm and a dopant surface concentration of about 10^{19} atoms/cm^3, said cell having a substantially thicker epitaxial layer of silicon, doped with an impurity concentration which will provide the desired surface impurity concentration for the diffused back surface field region, interposed between the back surface filed region and the cell back contact, said interposed layer having a thickness sufficient to provide required cell ruggedness, wherein the top of said cell is bonded to a top cover-glass support by means of high temperature metallized bonding platforms on said cell and on said glass-cover, wherein said epitaxial layer at the back of said cell has a reduced thickness, being less than 25 microns thick, and wherein said thin epitaxial layer is contacted by a high temperature fine-line contact having bonding platforms.

4,673,771

UNIVERSAL BUILDING ENTRANCE TERMINAL

Michael L. Grant, Crawford, Nebr., assignor to U.S. West Enterprises, Inc., Minneapolis, Minn.

Filed May 7, 1986, Ser. No. 860,656
Int. Cl.[4] H02G *3/22*
U.S. Cl. 174—38 10 Claims



1. A universal building entrance terminal, for placement adjacent a cable outlet opening in a building wall to facilitate wiring interconnection therewith, comprising:

a substantially weatherproof housing having at least one access opening in a wall thereof for positioning adjacent a building to provide access for wires and cables;

said housing having a base portion adapted to be placed on the ground and partially embedded or buried therein and having an at least partially open bottom for receiving the end of a buried cable;

said housing having a service door and means for securing said door in place on said housing to form a substantially weatherproof enclosure;

an access cover, said cover having a cable receiving opening therein surrounded by a flange extending outwardly therefrom, said flange and cable receiving opening placed in an offset position in said access cover; and

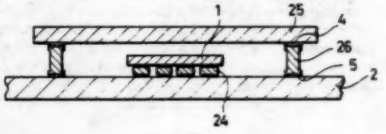
means for mounting said access cover on said housing over said access opening, in one of a plurality of different orientations to vary the position of the offset flange and cable receiving opening to permit alignment with a cable outlet opening in a wall of a building, said flange for abutting the wall of a building and said cable receiving opening for receiving wires or cables from the cable outlet opening of the building, whereby interconnections can be made between wiring from the building and the buried cable.

4,673,772

ELECTRONIC CIRCUIT DEVICE AND METHOD OF PRODUCING THE SAME

Ryohei Satoh; Muneo Oshima; Minoru Tanaka, all of Yokohama; Suguru Sakaguchi, Chigasaki; Akira Murata, Tokyo, and Kazuo Hirota, Chigasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 4, 1985, Ser. No. 784,035
Claims priority, application Japan, Oct. 5, 1984, 59-208072
Int. Cl.[4] H01L *23/14*
U.S. Cl. 174—52 FP 12 Claims



1. An electronic circuit device comprising:

a substrate;

an assembly mounted on said substrate; and

solder for connecting said assembly to said substrate;

said solder being composed of low-melting-point solder portions and a high-melting-point solder portion subjected to working and heat treatment; and

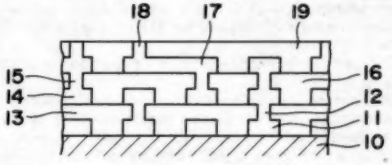
said high-melting-point solder portion being connected to both of said substrate and said assembly through said low-melting-point solder portions.

4,673,773

MULTILAYER PRINTED CIRCUIT BOARD

Tsunetomo Nakano; Hiroshi Yasuno, and Kazuaki Nishio, all of Ichihara, Japan, assignors to Ube Industries, Ltd., Ube, Japan

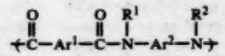
Filed Feb. 26, 1985, Ser. No. 705,745
Claims priority, application Japan, Feb. 27, 1984, 59-35770
Int. Cl.[4] H05K *1/14*
U.S. Cl. 174—68.5 8 Claims



1. In a multilayer printed circuit board comprising an insu-

lating substrate and a plurality of circuit elements provided thereon in layers, each of which comprises a circuit pattern and an insulating resin layer provided over the circuit pattern, the circuit patterns being arranged adjacent to each other and being portionwise connected electrically through at least one hole in an insulating resin layer therebetween, the improvement wherein said insulating resin layer comprises an aromatic polyamide photoset resin, said aromatic polyamide comprising:

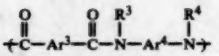
at least 10 molar % of a constitutional unit of the formula (Ia):



(Ia)

wherein each of R^1 and R^2 independently is a hydrogen atom or a residue of a reactive organic compound selected from the group consisting of the acetyl, acryloyl, methacryloyl, cinnamoyl and p-azidobenzoyl, Ar^1 is a divalent aromatic residue of an aromatic dicarboxylic acid compound and Ar^2 is a divalent aromatic residue of an aromatic diamine compound containing a photosensitive group, and

at most 90 molar % of a constitutional unit of the formula (Ib):



(Ib)

wherein each of R^3 and R^4 independently is a hydrogen atom or a residue of a reactive organic compound selected from the group consisting of acetyl, acryloyl, methacryloyl, cinnamoyl and p-azidobenzoyl, Ar^3 is a divalent aromatic residue of an aromatic dicarboxylic acid compound and Ar^4 is a divalent aromatic residue of an aromatic diamine compound.

4,673,774

SUPERCONDUCTOR

Masayoshi Wake, Uehara; Osamu Taguchi, and Mitsuyuki Imaizumi, both of Amagasaki, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 5, 1985, Ser. No. 795,108

Claims priority, application Japan, Nov. 6, 1984, 59-233442

Int. Cl.[4] H02G *15/08*; H01R *4/00*

U.S. Cl. 174—94 R **2 Claims**

1. A superconductor joint comprising two superconducting wires axially aligned and butt-jointed, a superconducting doubling wire extending along and electrically connecting the superconducting wires, and a stabilizer attached to said superconductors and said doubling wire to extend therealong, said superconductors, said doubling wire and said stabilizer together forming a superconductor of a constant cross-sectional area.

2. A method for manufacturing a superconductor joint comprising the steps of:

butt joining adjacent ends of superconducting wires;

surrounding the butt-jointed superconducting wires with extruded stabilizer material;

removing a portion of said stabilizer material to expose the butt-jointed end regions of said superconducting wires; and

bonding a superconducting doubling wire to the exposed surface of said superconducting wires to electrically and mechanically connect said two superconducting wires across said butt-joint.

4,673,775

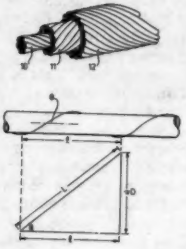
LOW-LOSS AND LOW-TORQUE ACSR CONDUCTORS

Olaf Nigol, 272 Markland Drive, Toronto, Ontario, Canada (M9C 1R7); John S. Barrett, R.R. #8, Orangeville, Ontario, Canada (L9W 3T5), and Martin A. Green, 49 Hunting Ridge, Etobicoke, Ontario, Canada M9R 1C1

Filed Apr. 7, 1986, Ser. No. 848,758

Int. Cl.[4] H01B *5/10*

U.S. Cl. 174—130 **11 Claims**



7. An ACSR conductor having two layers of aluminum conductor strands helically wound around a steel core, one layer being wound in a right-handed helix and the other layer being wound in a left-handed helix, wherein the conductor cross sectional areas A_1, A_2 of the layers in square millimeters and the lay lengths l_1, l_2 of the layers in millimeters are such that

$$\left| \frac{A_1}{l_1} + \frac{A_2}{l_2} \right| \leqq .10 \text{ mm.},$$

l_1 and l_2 being of opposite sign.

4,673,776

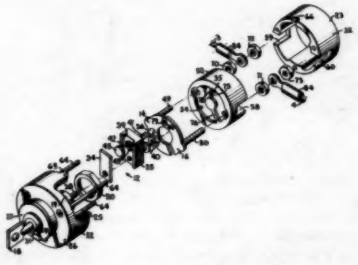
LOCKING SWITCH FOR AUTOMOBILE ELECTRICAL SYSTEMS AND THE LIKE

Michael H. Sambursky, Independence, Mo., assignor to K & S Systems, Inc., Kansas City, Mo.

Filed Nov. 22, 1985, Ser. No. 800,660

Int. Cl.[4] H01H *27/06*

U.S. Cl. 200—43.08 **2 Claims**



2. In combination with a vehicle having a body panel and an electrical system including a battery and a cable connecting the

battery to the vehicle, the improvement of a locking switch in the electrical cable, which comprises:

(a) a casing including:

(1) a lock casing section with an interior chamber, a threaded neck extending through said body panel aperture and a lock collar threadably received on said neck whereby said lock casing section is attached to said body panel with said threaded neck extending therethrough; and

(2) an insulator casing section including a bore terminating at a closed end and a pair of lead openings communicating with said bore; and

(3) a cylinder lock bore extending through said neck and open at said interior chamber (add body panel aperture);

(4) one of said casing sections having a notch and the other of said casing sections having a detent receivable in said notch whereby said casing sections are aligned in a predetermined relationship when fastened together;

(b) a cylinder lock connected to said lock casing section and projecting into said interior chamber thereof, said lock having a tumbler rotatable about a central axis of said lock;

(c) said tumbler having a range of rotational movement of substantially 180° between open and closed positions;

(d) a lock cam connected to said lock within said lock casing section chamber and rotatable about the central axis of said lock, said lock cam including:

(1) a camming body attached to said lock, said camming body including an eccentrically placed bore through said camming body in parallel, spaced relationship relative to the central axis of said lock, said camming body bore having a proximate end and a restricted distal end;

(2) a spring received in said camming body bore;

(3) an insulator plug placed over said proximate end of said bore and engaging said spring; (add electrically insulative)

(4) a plate connected to said tumbler and said camming body over said camming body bore proximate end in engagement with said insulator plug;

(5) a conductor ball received in said camming body bore and engaged by said spring, said conductor ball having a greater diameter than said camming body bore restricted distal end whereby most of said conductor balls within said camming body bore and said conductor ball projects outwardly from said camming body;

(e) a circuit insulator received in said insulator casing section and including:

(1) an outer end located in proximity to said lock cam;

(2) an inner end abutting said insulator casing section closed end;

(3) a pair of terminal notches at said inner end;

(4) primary and secondary stud receivers each extending longitudinally through said circuit insulator between said outer end and a respective notch, each said stud receiver extending in parallel, spaced relation with respect to said cylinder lock central axis;

(5) a flat, shallow cavity at said circuit insulator outer end;

(f) an electrically conductive primary stator including:

(1) a substantially planar outer surface and an inner surface adjacent said circuit insulator outer end;

(2) a position in said circuit insulator cavity partially encircling said central axis through an angle of greater than 180°;

(3) first and second ends;

(4) an arcuate path of travel of said ball around said lock central axis along said outer surface through approximately 180° from said first end to a point in spaced relation from said second end;

(5) a partly spherical primary stator indentation open at said outer surface at said first end and aligned with said arcuate path of travel of said ball, said indentation being sized to receive and contact a portion of said ball;

(6) a primary, integral, threaded terminal stud extending inwardly from said primary stator inner surface through said primary stud receiver; and

(7) inner and outer nuts threadably received on said primary stud and clamping said vehicle electrical cable therebetween, said outer nut engaging said circuit insulator;

(g) an electrically conductive secondary stator including:

(1) a substantially planar outer surface and an inner surface adjacent said circuit insulator outer end;

(2) a position in said circuit insulator cavity partially encircling said central axis through an angle of less than 180°;

(3) first and second ends positioned in spaced relation from said primary stator first and second ends respectively;

(4) a partly spherical secondary stator indentation open at said outer surface at said first end and aligned with said primary stator indentation whereby a partly spherical contact indentation is defined, said secondary stator indentation being sized to receive and contact a portion of said ball;

(5) a secondary, integral, threaded terminal stud extending inwardly from said secondary stator inner surface and through said secondary stud receiver; and

(6) inner and outer nuts threadably received on said secondary stud and clamping said vehicle electrical cable therebetween, said outer nut engaging said circuit insulator;

(h) said contact indentation being aligned with said tumbler whereby said ball is positioned in contact with said stator indentations with said tumbler in its closed position; and

(i) said contact ball engaging said primary stator outer surface in a continuous, biased, rolling engagement along said path of travel of said ball through approximately 180°.

4,673,777

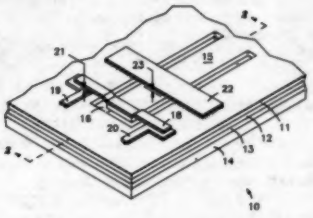
MICROBEAM SENSOR CONTACT DAMPER

Monty W. Bai, Scottsdale; John D. Titus, Phoenix, and Louis P. Farace, Mesa, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 9, 1986, Ser. No. 872,072

Int. Cl.[4] H01H *35/14, 57/00*

U.S. Cl. 200—61.45 R **8 Claims**



1. A microbeam sensor contact damper comprising:

a first layer of a silicon wafer having an upper surface, a lower surface, and an opening disposed therethrough said first layer defining a microbeam having a first end and a second end opposite said first end, in said opening of said first layer of said silicon wafer, said first end of said microbeam extending from said first layer of said silicon wafer; and

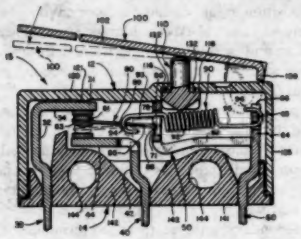
damper means for damping the movement of said microbeam, said damper means being coupled to said upper surface of said first layer of said silicon wafer and being disposed above said microbeam so that a gap exists between said damper means and said microbeam when said microbeam is at rest.

4,673,778

SNAP ACTION SWITCH

Raymond F. Lewandowski, Mount Prospect; Jacek P. Doros, Highwood, and William H. Redfield, Lake Forest, all of Ill., assignors to The Cherry Corporation, Waukegan, Ill.

Filed Feb. 5, 1985, Ser. No. 698,436
Int. Cl.[4] H01H 21/04
U.S. Cl. 200—67 B 11 Claims



1. A snap action switch comprising:

a first contact member having a horizontal member and a vertical member forming a central angle therebetween, said vertical member having at least one protruding portion extending transversely therefrom;

a pivot bracket assembly including a moveable contact member adapted to be alternately engaged and disengaged with said first contact member upon operation of the switch, said assembly having a horizontal member and a vertical member forming a central angle therebetween, said vertical member having at least one protruding portion extending transversely therefrom;

a cover having means for slidingly receiving the protruding portion of the first contact member and the protruding portion of the pivot bracket assembly, said cover also including means for engaging the horizontal members of said first contact member and said pivot bracket assembly; and

a base having means for engaging the protruding portion of said first contact member and the protruding portion of said pivot bracket assembly and, upon insertion of the base into the cover, pressing said contact member and pivot bracket assembly against the engaging means of the cover, causing said contact member and said assembly to be deformed about said central angles into predetermined operational positions.

4,673,779

LOW-VOLTAGE CIRCUIT BREAKER INCLUDING A CURRENT TRANSFORMER

Peter Bohnen; Günter Prietzel, and Reinhard Kugler, all of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jan. 23, 1986, Ser. No. 821,849
Claims priority, application Fed. Rep. of Germany, Feb. 7, 1985, 3504423
Int. Cl.[4] H01H 33/12
U.S. Cl. 200—146 R 4 Claims

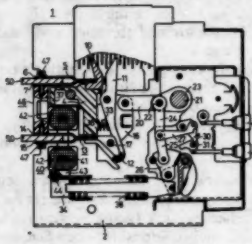
1. A multiple pole low-voltage circuit breaker comprising:

upper and lower connecting bars for connecting a contact arrangement of each pole of the circuit breaker to a current circuit;

an insulating carrier arranged between side walls of the circuit breaker for supporting the contact arrangements and connecting bars of all the poles;

a current transformer provided for each pole, the current transformer at least partly enclosing one of said connecting bars and being supported upright independently of said connecting bars by a cross piece connecting said side walls;

an insulating piece inserted between said upper and lower connecting bars and attached to said upper and lower connecting bars, said insulating piece having tapped holes for receiving clamping screw means whereby said insulating piece is clamped to said connecting bars by said clamping screw means, said insulating piece and said insulating carrier forming a pocket for receiving a part of said current transformer disposed opposite a part of said current transformer supported by said cross piece.

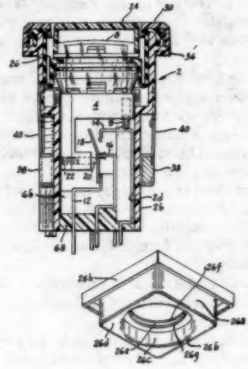


4,673,780

SEALED RECTANGULAR PUSHBUTTON SWITCH

Sidney Kenway, Fountain Valley, Calif., assignor to Eaton Corporation, Cleveland, Ohio

Filed Feb. 10, 1986, Ser. No. 827,998
Int. Cl.[4] H01H 13/06
U.S. Cl. 200—302.2 8 Claims



1. A pushbutton switch comprising, in combination:

a housing having a rectangular opening in a forward end thereof defined by interior surfaces of housing sidewalls;

switch contacts mounted within said housing;

operating means mounted for linear reciprocal movement in said housing for operating said switch contacts, said operating means comprising a single rectangular pushbutton disposed within said substantially filling said rectangular opening, said pushbutton being depressible inwardly of said housing, a cylindrical sealing surface disposed rearwardly of said rectangular pushbutton and having its axis aligned with said linear reciprocal movement, and a raised annular rib on said cylindrical sealing surface; and

a resilient seal disposed over said forward end of said housing, said seal comprising a tubular rectangular body having sidewalls extending inwardly into said rectangular opening along said interior surfaces of said housing sidewalls substantially beyond said cylindrical sealing surface, a cylindrical portion centrally disposed within said rectan-

gular body having its axis aligned with said linear reciprocal movement, a forward end of said cylindrical portion comprising a pair of axially spaced circular openings for engaging said cylindrical sealing surface on opposite sides of said annular rib for attachment to said operating means, a rear end of said cylindrical portion and a rear end of said rectangular body joined together by a reflex bend which is semicircular at points where said cylindrical portion is tangential to said rectangular body, and comprises flat transverse wall sections at corners of said rectangular body between said tangential points, said flat wall sections joining said cylindrical portion and said rectangular portion by radiused portions which are continuations of said semicircular shape, said cylindrical portion translating rearwardly upon depression of said pushbutton causing said semicircular reflex bend to roll rearwardly along said interior surfaces of said housing sidewalls at said tangential points and causing said radiused portion adjacent said cylindrical portion to roll rearwardly with respect to said flat wall sections between said tangential points.

4,673,781

ELECTROMAGNETIC INDUCTION DEVICE FOR HEATING METAL ELEMENTS

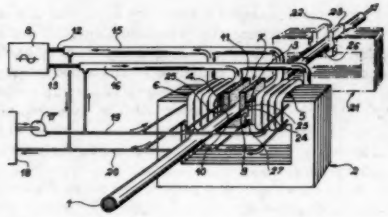
Jacques Nuns, Ecuelles, and Joseph Abraham, Rouffach, both of France, assignors to Electricite de France, Paris and Celes, Lautenbach, both of, France

Filed Jun. 27, 1985, Ser. No. 749,303

Claims priority, application France, Jun. 28, 1984, 84 10225

Int. Cl.⁴ H05B 6/42

U.S. Cl. 219—10.49 R **6 Claims**



1. An electromagnetic induction device for heating metal elements having at least one flat loop magnetic circuit open at two facing ends, an inductor wound onto said magnetic circuit and the element to be heated positioned between the air gap located between the two ends of the loop, wherein said inductor comprises two windings wound around the magnetic circuit, respectively in the vicinity of the two ends of the loop, said windings being respectively supplied by in phase alternating currents, each end of the loop becoming thinner towards the air gap in the form of a chamfer, this chamfer being formed over the entire circumference of each end of the loop, the magnetic circuit having, at least in the vicinity of said ends, cooling means constituted by at least one tube traversed by a cooling fluid and positioned within the magnetic circuit, wherein the magnetic circuit comprises an assembly of plates respectively cut in the form of elementary loops open at both ends, said plates being cut and assembled in such a way that their ends form the chamfers.

4,673,782

PROCESS AND APPARATUS FOR MICROWAVE MELTING SOLIDIFIED GEL MASSES, IN PARTICULAR OF PHOTOGRAPHIC EMULSIONS

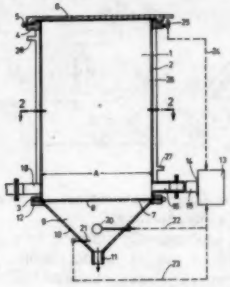
Günther Koepke; Hans Frenken, both of Odenthal, and Josef Friedsam, Langenfeld, all of Fed. Rep. of Germany, assignors to Agfa Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Sep. 3, 1985, Ser. No. 771,649

Claims priority, application Fed. Rep. of Germany, Sep. 13, 1984, 3433580

Int. Cl.⁴ H05B 6/78

U.S. Cl. 219—10.55 M **13 Claims**



1. A process for melting, by microwaves, solidified gel masses which are introduced as solid pieces of any shape or form into a melting container equipped with microwave generating means and having a bottom with openings, gel mass flowing, after it has melted, through the openings of the bottom into a receiver underneath it, wherein the improvement comprises directing and restricting the microwaves to a zone of effectiveness of the microwaves, which zone is interpositioned between zones above and below the zone of effectiveness, the zone above the zones of effectiveness is within the container and the zone below the zone of effectiveness is below the bottom with openings, directing the microwaves only to the ground layer of gel mass situated in said zone of effectiveness above and close to the bottom of the melting container, shielding the receiver against microwaves by a bottom capable of preventing microwave energy from penetrating into said receiver, and controlling the flow of energy from the generator producing the microwaves in dependence upon the quantity of melt discharged from the receiver or in dependence upon the temperature of the melt in the receiver.

4,673,783

COMPACT HIGH-FREQUENCY HEATING APPARATUS WITH STEPPED WAVEGUIDE

Ryuji Igarashi, and Yukio Suzuki, both of Aichi, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 23, 1986, Ser. No. 877,402

Claims priority, application Japan, Jun. 24, 1985, 60-137320; Jun. 26, 1985, 60-139353; Oct. 18, 1985, 60-233080

Int. Cl.⁴ H05B 6/72

U.S. Cl. 219—10.55 F **14 Claims**

1. A high-frequency heating apparatus comprising:

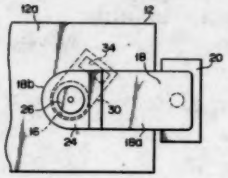
an inner casing defining a heating chamber therein, said inner casing including a top wall having a circular excitation opening;

high-frequency oscillator means for generating high-frequency waves;

a fixed waveguide fixed on the top wall of the inner casing and having one end communicating with the excitation opening and the other end connected to the high-frequency oscillator means, for guiding the high-frequency

waves fed from the high-frequency oscillator means to the excitation opening, said fixed waveguide including a step portion facing the excitation opening and located closer to the top wall than the other portion of the fixed waveguide, said end of the fixed waveguide communicating with the excitation opening and having a semicircular side wall extending substantially perpendicularly to the top wall of the inner casing, said side wall having a central axis coaxial with the excitation opening;

a motor mounted on the step portion of the fixed waveguide and including a driving shaft extending through the exci-



tation opening into the heating chamber and coaxial with the excitation opening;

a rotating waveguide for diffusing the high-frequency waves delivered to the excitation opening and radiating the waves into the heating chamber, said rotating waveguide being disposed in the heating chamber such that one end of the rotating waveguide covers the excitation opening and is coupled to the driving shaft to be rotated by the motor; and

an outer casing surrounding said inner casing, said high-frequency oscillator means, said fixed waveguide, said motor, and said rotating waveguide.

4,673,784

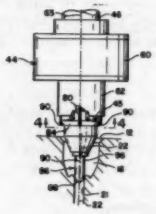
VALVE SEAT INDUCTOR AND METHOD OF USING SAME

Robert V. Vickers, Chagrin Falls, Ohio, assignor to Tocco, Inc., Boaz, Ala.

Continuation of Ser. No. 712,744, Mar. 18, 1985, abandoned. This application Oct. 27, 1986, Ser. No. 921,906

Int. Cl.[4] H05B *6/10*

U.S. Cl. 219—10.57 **16 Claims**



1. An apparatus for inductively heating the frustoconical valve seat surface of a valve port or an engine component having a valve stem bore coaxially disposed with respect to the valve seat surface, said apparatus comprising:

an inductor coil having a conical surface complementary to the valve seat surface;

frame means for advancing said coil toward the valve seat with the axis of the coil surface being substantially parallel to the axis of the valve seat;

bearing means operative between the inductor coil and the frame means accommodating radial and angular movement of said inductor coil to an orientation wherein the axes of the conical surfaces are coincident;

an elongated nose member having a cylindrical surface coaxial with the conical surface of the valve seat, said cylindrical surface having a close telescopic sliding fit with and entering the bore of said port upon advancing of said frame means and when received therewithin establishing coincidence of the axes as accommodated by said bearing means; and,

non-magnetic insulating spacer means attached to said conical surface of said coil having outer reference surfaces thereon lying on a conical surface spaced from the inductor coil a predetermined distance thereby prescribing concentricity and axial spacing between the conical surfaces of the seat and said coil.

4,673,785

AUTOMATIC APPARATUS FOR INDUCTION HARDENING

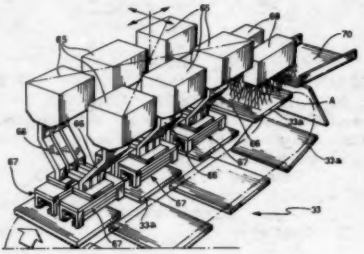
Fernando Damiani, Turin, Italy, assignor to COMAU S.p.A., Grugliasco, Italy

Filed Jun. 26, 1986, Ser. No. 878,786

Claims priority, application Italy, Jul. 3, 1985, 67613 A/85

Int. Cl.[4] H05B *6/40*

U.S. Cl. 219—10.57 **11 Claims**



1. Automatic apparatus for induction hardening of parts of metal objects, comprising a fixed structure, inductor means for induction heating of the parts of metal objects to be hardened in the structure, stepwise conveyor means for advancing the objects past the inductor means, and rapid cooling means for cooling the objects downstream of the inductor means, wherein the inductor means is supported by a frame which is movable during the induction heating in two directions substantially perpendicular to each other in a horizontal plane above the parts of the objects to be hardened, means for reciprocating the frame in the two directions so as to impart to the inductor means during the induction heating a substantially circular movement in the horizontal plane above the parts of the objects to be hardened, and means for moving the frame vertically so as to enable adjustment of the vertical distance between the objects and the inductor means.

4,673,786

ELECTRICAL RESISTANCE GRID WELDING MACHINE

Hans Gött; Josef Ritter; Gerhard Ritter, and Klaus Ritter, all of Graz, Austria, assignors to EVG Entwicklungs- u Verwertungs-Gesellschaft m.b.H., Graz, Austria

Filed Jan. 3, 1985, Ser. No. 688,633

Claims priority, application Austria, Jan. 13, 1984, 94/84

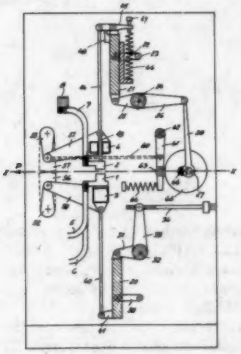
Int. Cl.[4] B23K *11/00*

U.S. Cl. 219—56 **8 Claims**

1. An electrical resistance welding machine for welding a family of wires into a strip of welded mesh, said family of wires passing through said machine at a continuous rate along a feedpath, comprising

a row of electrodes and a row of counter-electrodes arranged above and below said family of wires,

first and second electrode beams supporting said row of electrodes and said row of counter-electrodes respectively, said electrodes and counter-electrodes being arranged at intervals along said electrode beams in opposition to one another, said electrode beams being adapted to carry out reciprocating movement substantially parallel to said feedpath, said first and second electrode beams being coupled together for synchronized movement, said row of counter-electrodes being supported in said second electrode beam for shifting movement relative to said second



electrode beam in a direction perpendicular to said feedpath,

first and second pressure beams associated with and connected to said first and second electrode beams respectively, one of said pressure beams being connected to its associated electrode beam so as to transmit electrode pressure to said electrodes and counter-electrodes while allowing said electrode beams to carry out their reciprocal motion, said pressure beam associated with said shiftable counter-electrodes being supported for reciprocating movement in a direction perpendicular to said feedpath in synchronization with said reciprocal movements of said first and second electrode beams.

4,673,787

ELECTROEROSION METHOD OF WIRE-CUTTING A DESIRED CONTOUR IN A WORKPIECE

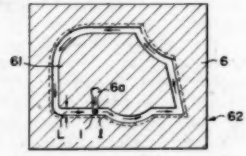
Kiyoshi Inoue, Tokyo, Japan, assignor to Inoue-Japax Research Incorporated, Kanagawaken, Japan

Filed Feb. 5, 1981, Ser. No. 231,880

Claims priority, application Japan, Feb. 5, 1980, 55-13186

Int. Cl.⁴ B23P *1/08*

U.S. Cl. 219—69 W **8 Claims**



1. A method of cutting a workpiece to form a desired final contour therein with a continuous wire electrode which has a predetermined thickness and is adapted to be axially advanced to linearly traverse the workpiece across a cutting zone and also displaced relative to the workpiece transversely to the axis of the wire electrode, said method comprising the steps of:

(a) electroerosively rough-cutting said workpiece while effecting the transverse relative displacement between said wire electrode and said workpiece along a first predetermined path corresponding to said desired final contour and prescribed to generate a desired rough-cut contour with an overcut α in said workpiece; and

(b) electroerosively finish-cutting said rough-cut workpiece while effecting the transverse displacement between said wire electrode and said workpiece along a second predetermined path substantially uniformly by a distance defined by the product $n\alpha$ where n is a value essentially proportional to the thickness of the workpiece traversed by the wire electrode, thereby generating a finish-cut contour coinciding with said desired contour in said workpiece,

said first predetermined path being preprogrammed in a numerical controller associated with a drive system for effecting said transverse displacement between said wire electrode and said workpiece for executing the step (a) on the basis of said desired contour and said desired overcut α,

said second predetermined path being preprogrammed in said numerical controller on the basis of said first predetermined path and adding thereto information representing the expression $n\alpha$ for executing the step (b).

4,673,788

STRAIGHTENING DEVICE FOR THE WIRE OF A WIRE ELECTROEROSION MACHINE

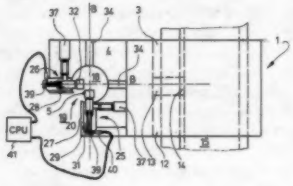
René Buchler, Sonnental, Switzerland, assignor to Büchler B-Set A.G., Flawil, Switzerland

Filed Nov. 14, 1984, Ser. No. 671,422

Claims priority, application Switzerland, Nov. 15, 1983, 6150/83

Int. Cl.⁴ B23H *7/10*

U.S. Cl. 219—69 W **9 Claims**



1. A straightening device for aligning a cutting electrode of an electroerosion machine having rolls to guide the cutting electrode, said device comprising:

a block having a bore extending in a vertical direction,

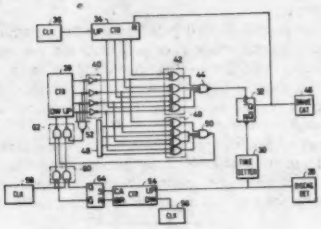
a least one end portion of said block being provided with a contact point for said cutting electrode whereby contact elements of said contact point are placed in said bore, each of said contact elements having a contact surface, each of said contact surfaces lying in a different plane, said block having a corner part thereof removed so that said cutting electrode can enter said bore and contact said contact elements of said contact point, and wherein said contact point is connected to a central processing unit of said electroerosion machine which controls the rolls.

wherein said contact point contains two contacting means that are at right angles to one another, first horizontally directed bores are arranged in the walls of said block whereby in said bores the respective contacting means is mounted in a rotary manner, each of said contacting means comprising a pin having a bolt and said contact element which is placed in said bore and fitted eccentrically to one end of said pin which is rotatably mounted in one of said horizontal bores.

4,673,789
POWER SOURCE FOR WIRE CUT ELECTRICAL DISCHARGE MACHINING

Yoshio Ozaki, and Kazuo Tsurumoto, both of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP83/00158, § 371 Date Jan. 25, 1984, § 102(e) Date Jan. 25, 1984, PCT Pub. No. WO83/04203, PCT Pub. Date Dec. 8, 1983
PCT Filed May 25, 1983, Ser. No. 579,196
Claims priority, application Japan, May 25, 1982, 57-88304
Int. Cl.[4] B23H *1/02, 7/04*
U.S. Cl. 219—69 W 6 Claims



1. A power source for producing a discharge voltage for a wire-electrode type discharge machining apparatus, comprising:

means for producing a signal indicating presence of a discharge between a wire electrode and a workpiece being machined with said wire electrode;

a first clock source for producing as an output clock pulses at a first frequency, said first frequency being set in proportion to a limit current, said limit current being slightly less than a threshold current at which said wire will break;

a first up-down counter receiving on one of count-up and count-down inputs thereof said signal indicative of said discharge and on the other of said count-up and count-down inputs said output of said first clock pulse source;

a second clock source for producing as an output clock pulses at a second frequency, said frequency being set in accordance with a maximum allowed rate of change of duty cycle of said discharge voltage;

a second up-down counter;

means for applying said output of said second clock pulse source to one of a count-up and a count-down input of said second up-down counter selected in response to a count output of said first up-down counter;

a third clock pulse source for producing as an output clock pulses at a third frequency, said third frequency being set in accordance with a duty cycle of said discharge voltage;

a third counter receiving as a clock input said output of said third clock pulse source;

means for comparing a count output of said second counter with a count output of said third counter;

means for producing a pulse signal occurring a predetermined period of time following said signal indicative of said discharge; and

means for turning ON said discharge voltage in response to an output of said comparing means and OFF in response to said pulse signal occurring said predetermined period of time following said signal indicative of said discharge.

wherein said first, second and third frequencies are set such that an average current flowing between said wire electrode and said workpiece is restricted to a predetermined level.

4,673,790
COPPER BASED WIRE ELECTRODE FOR WIRE ELECTRO-DISCHARGE MACHINING

Kazuo Sawada, Osaka; Satoshi Takano, Suita, and Shigeo Ezaki, Takatsuki, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

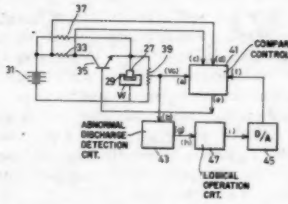
Filed May 23, 1985, Ser. No. 737,081
Claims priority, application Japan, May 23, 1984, 59-105508; Jun. 21, 1984, 59-128978
Int. Cl.[4] B22H *7/08*
U.S. Cl. 219—69 W 3 Claims

2. A wire electrode for use in an electro-discharge machining consisting of Zn of 30 through 40% by weight, Si of 0.1 through 1.2% by weight, Al of 0.01 through 0.18% by weight, and the remainder Cu.

4,673,791
METHOD AND APPARATUS FOR CONTROLLING AN ELECTRIC DISCHARGE MACHINE

Masanori Konno, Isehara; Kiyoshi Imai, Hiratsuka, and Toshihiro Dobashi, Koufu, all of Japan, assignors to Amada Company, Limited, Japan

Filed Aug. 22, 1985, Ser. No. 768,436
Claims priority, application Japan, Aug. 27, 1984, 59-176635
Int. Cl.[4] B23H *1/02*
U.S. Cl. 219—69 M 7 Claims



1. A process for controlling an electric discharge machine of the type in which an electric discharge is applied across a working gap between an electrode and an electrically conductive workpiece, comprising the steps of:

detecting an interpolar voltage porportional to the impedance of said working gap;

comparing said interpolar voltage to a variable reference voltage and applying a pulse voltage across said working gap when the predetermined time of interruption of the electric discharge has lapsed and said interpolar voltage has exceeded said variable reference voltage;

detecting and counting each occurrence of an abnormal discharge condition across said working gap;

comparing the number of such counted occurrences of abnormal discharge conditions over a predetermined time period to first and second predetermined set point values;

increasing said reference voltage when said number of counted occurrences over time exceeds said first predetermined set point value, thereby lengthening said time of interruption of the electric discharge; and

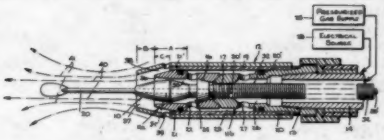
decreasing said reference voltage when said number of counted occurrences over time is less than said second predetermined set point value, thereby reducing said time of interruption of the electric discharge.

4,673,792

GAS-CONSTRICTED ARC NOZZLE

Thomas J. Gartland, Huntington Station, and Adrian T. Papanide, Jackson Heights, both of N.Y., assignors to Eutectic Corporation, Flushing, N.Y.

Filed Jan. 31, 1986, Ser. No. 824,525
Int. Cl.[4] B23K 9/00
U.S. Cl. 219—74 9 Claims



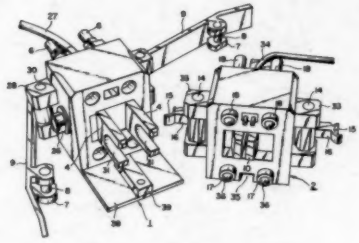
1. The method of focusing the shape of an electric-arc discharge on an axis from a discharge end of an electrode to a conductive workpiece, which method comprises developing a circumferentially uniformly confined and distributed and axially-downstream directed gas flow in concentric radial proximity to the electrode, said gas flow being discharged at a velocity in the trans-sonic range and at a location upstream from the discharge end of the electrode, and said gas flow being so substantial as to provide a circumferentially continuous annular shaping-confinement of the arc beyond the discharge end of the electrode.

4,673,793

CONNECTING METAL FITTINGS FOR RESISTANCE WELDER

Hiroshi Obara, Tokyo, Japan, assignor to Obara Corporation, Tokyo, Japan

Filed Nov. 8, 1985, Ser. No. 796,471
Claims priority, application Japan, Jul. 12, 1985, 60-105544[U]
Int. Cl.[4] B23K 11/00
U.S. Cl. 219—86.1 2 Claims



1. Connecting metal fittings for a resistance welder of the kind having one side including a transformer and another side including a resistance welding gun, the welder being of the kind having a water supply circulating line and an air supply circulating line, each line having a supply side and a side associated with the welding gun, the fittings comprising:

receiver metal fittings connected to the transformer side of the welder,

clamping metal fittings connected to the resistance welding gun side of the welder,

said receiver metal fittings including:

a pair of power supply connecting strips connected to terminal plates on the transformer side of the welder, said strips having respective notched grooves,

a pair of first cooling water lines connected to the supply side of the water supply circulating line of the welder,

a pair of first air supply lines connected to the supply side of the air supply circulating line of the welder, and

a pair of rotatable clamping handles having stopping cylinders and stopping pins provided on a handle lever thereof,

said clamping metal fittings including:

a shaft lever penetrating terminal plates on the welding gun side of the welder, said shaft lever being capable of penetrating said notched grooves in said power supply connecting strips of said receiver metal fittings,

a pair of plate springs respectively disposed inside spring sockets slidably provided on both ends of said shaft lever,

a pair of stopping levers fixed on cams of cam shafts provided outside said respective spring sockets and having stopping hooks provided on the tips of the cams,

a pair of second cooling water lines connected to the welding gun side of the water supply circulating line, and

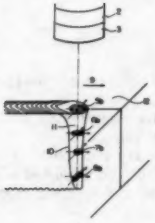
a pair of second air supply lines connected to the welding gun side of the air supply circulating line.

4,673,794

ELECTRON BEAM WELDING METHOD

Hirosada Irie, and Susumu Tukamoto, both of Yokohama, Japan, assignors to National Research Institute for Metals, Tokyo, Japan

Filed Mar. 25, 1986, Ser. No. 844,019
Claims priority, application Japan, May 10, 1985, 60-98010; May 10, 1985, 60-98011
Int. Cl.[4] B23K 15/00
U.S. Cl. 219—121 ED 3 Claims



1. An electron beam welding method which comprises forming by means of a magnetic or electric field set up by an even number of at least two magnetic poles or electrodes, an electron beam of high power density, the pattern of which beam has in a first zone in the axial direction of the beam an elliptical or similar shaped cross section having a major axis and a minor axis and in a second zone in the axial direction of the beam a cross section having a major axis extending in a direction perpendicular to the major axis of said first-named cross section, and a minor axis; and placing a material to be welded in a position relative to said electron beam such that the surface of the material to be welded is in said first zone and the root portion of the weld cavity formed by said electron beam is in said second zone.

4,673,795

INTEGRATED ROBOTIC LASER MATERIAL PROCESSING AND IMAGING SYSTEM

Angel L. Ortiz, Jr., Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 15, 1984, Ser. No. 660,837
Int. Cl.[4] B23K 26/00
U.S. Cl. 219—121 L 18 Claims

1. An integrated laser material processing and imaging system comprising:

a material processing laser for providing a laser beam;

an image processing device for receiving and processing an image;

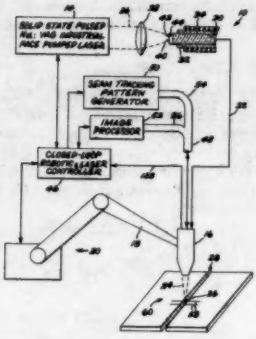
a remote module adapted for manipulation by a robot in the proximity of a workpiece;

a high energy optical fiber for transmitting material process-

ing laser energy, the input end of said high energy optical fiber coupled to receive the beam from said material processing laser, and the output end of said high energy optical fiber connected to said remote module;

a fiber optic bundle for transmitting an image, one end of said fiber optic bundle coupled to said image processing device, and the other end of said fiber optic bundle connected to said remote module; and

a plural path optical system in said remote module for focusing the laser beam emerging from the output end of said high energy optical fiber along a first optical path to a focal point on the workpiece and for imaging a portion of the workpiece along a second optical path onto said other



end of said fiber optic bundle, said optical system including:

a single objective lens serving both said first and said second optical paths;

a holder supporting said other end of said fiber optic bundle physically on an in-line axis in axial alignment with said objective lens and comprising said second optical path;

elements for folding said first optical path between a common axis portion including said objective lens and an energy delivery axis which is non-coincident with said in-line axis; and

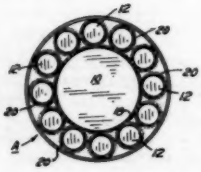
a holder supporting said output end of said high energy optical fiber on said energy delivery axis.

4,673,796

ARC WELDING ELECTRODE

Matt Kiilunen, Brighton, Mich., assignor to Weld Mold Company, Brighton, Mich.

Filed Dec. 9, 1985, Ser. No. 806,532
Int. Cl.[4] B23K *35/02*
U.S. Cl. 219—145.22 **4 Claims**



1. An arc welding electrode, comprising a solid central low carbon steel rod electrode, a plurality of solid lesser diameter low carbon steel rod electrodes circumferentially grouped about said central electrode and longitudinally aligned therewith, means maintaining the central rod electrode and lesser diameter rod electrodes in a cluster relationship, and a tightly adherent flux coating on each of said rod electrodes and having a composition which produces during a welding operation a weld deposit of niobium-free nickel-chromium-molybdenum type allow characterized as dense, porous-free and homogenous, said flux coating having substantially the following composition:

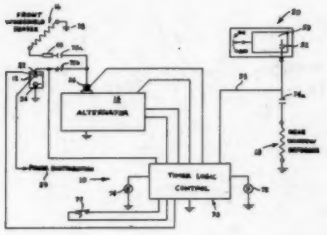
INGREDIENT	FROM ABOUT % TO ABOUT % BY WEIGHT
Manganese	2 to 12
Silicon	2 to 10
Iron	5 to 35
$CaCO_3$	20 to 60
CaF_2	8 to 35
Chromium	3 to 12
Silicate	5 to 15
Molybdenum	0 to 10
Tungsten	0 to 10
Nickel	0 to 15
Titanium	0 to 15
Vanadium	0 to 3.

4,673,797

POWER CONTROL FOR HEATED WINDSHIELDS

Richard A. Weirick, Grandville, Mich., assignor to Donnelly Corporation, Holland, Mich.

Filed Oct. 28, 1985, Ser. No. 792,131
Int. Cl.[4] H05B *1/02*
U.S. Cl. 219—203 **18 Claims**



1. An electrical control system for an automotive vehicle including a battery; an alternator having a field winding; a first voltage regulator coupled to the battery, the alternator output, and the alternator field winding for regulating the alternator output at a first regulated uniform voltage; and a high-voltage accessory, said control system comprising:

a second voltage regulator;

switching means actuable for operatively coupling said second voltage regulator to the battery, the alternator output; and the first voltage regulator to cooperate with the first voltage regulator to regulate the alternator output at a second regulated uniform voltage higher than the first voltage to power the high-voltage accessory; and

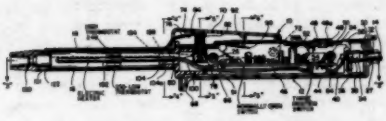
protective means for operatively disconnecting the battery from the alternator output when said switching means is actuated to protect the battery from the second higher voltage.

4,673,798

DUAL TEMPERATURE ELECTRIC CURLING IRON HAVING A SAFETY SHUT-OFF CIRCUIT

Robert F. Contri, Westmont, and William R. Hemrich, Glen Ellyn, both of Ill., assignors to John Zink Company, Tulsa, Okla.

Filed Apr. 2, 1986, Ser. No. 847,360
Int. Cl.[4] H05B 1/02; A45D 1/04
U.S. Cl. 219—225 7 Claims



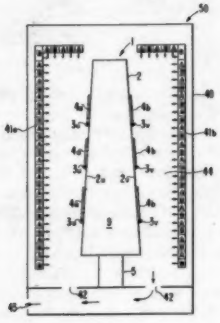
1. A curling iron for conditioning a lock of hair by applying heat, comprising: a handle, a barrel connected to said handle, means connected to said handle for receiving electric current from a suitable source; electrically energized heater means connected to said current receiving means for energization by said electric current for heating said barrel; said heating means comprising an electric resistance heater mounted in good heat conduction relationship with said barrel, a hair clamp pivotally mounted to said barrel for holding a lock of hair wound thereabout in good heat conducting engagement with said barrel; sensing means for sensing when said clamp has been opened to release said lock of hair or to allow another lock of hair to be wound about said barrel and producing an in-use signal in response thereto; and heating control means including means responsive to said in-use signal connected to said heater means for de-energizing said heating means a preselected time interval after receiving said in-use signal from said sensing means.

4,673,799

FLUIDIZED BED HEATER FOR SEMICONDUCTOR PROCESSING

Imad Mahawili, Sunnyvale, Calif., assignor to Focus Semiconductor Systems, Inc., Sunnyvale, Calif.

Filed Mar. 1, 1985, Ser. No. 707,262
Int. Cl.[4] C23C 16/48, 16/44
U.S. Cl. 219—399 5 Claims



1. A reactor for processing semiconductor wafers comprising:

a reactor chamber for containing semiconductor wafers the wafers being mounted on a first side of one or more supports so that one side of each wafer is adjacent a first side of one of said supports and the other side of each wafer is exposed to the environment of the reactor chamber, each support having a second side on which wafers are not mounted; and

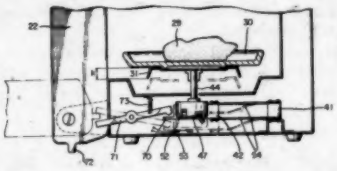
a fluidized bed heater for uniformly heating semiconductor wafers within said reactor chamber by heating the one or more supports on the second side so that the wafers on the first side are heated by heat transferred through the one or more supports.

4,673,800

COOKING APPARATUS WITH WEIGHING DEVICE

Kazumi Hirai, Nabari; Mitsuo Akiyoshi, Nara; Chikao Nakano, Yamatokoriyama; Kenji Watanabe, and Satoru Kodama, both of Nara, all of Japan, assignors to Matsushita Electric Industrial Co. Ltd., Osaka, Japan

Division of Ser. No. 728,610, Apr. 29, 1985, Pat. No. 4,595,827.
This application Mar. 6, 1986, Ser. No. 836,717
Claims priority, application Japan, May 2, 1984, 59-88702; Jun. 8, 1984, 59-118445; Jul. 26, 1984, 59-155829
Int. Cl.[4] H05B 6/68
U.S. Cl. 219—518 6 Claims



1. A cooking apparatus comprising:

a heating chamber for housing an object to be heated;

a heating source for heating said object;

a rotary table disposed inside said heating chamber for supporting said object;

a driving device for driving said rotary table, said driving device being housed in the space defined between the bottom surface of said heating chamber and the bottom of the body of said cooking apparatus;

first and second mounting blocks;

a vibration mechnaism including a plurality of leaf springs supporting said rotary table, each of said leaf springs having a first end attached to said first mounting block and a second end attached to said second mounting block for mounting said leaf springs parallel to each other, the vibration frequency of said plurality of leaf springs varying with the weight of said object; and

a detector having an output signal for detecting the vibration of said rotary table, whereby the weight of said object is calculated on the basis of the output signal of said detector, and the output of said heating source, the heating mode and the heating time are controlled in correspondence with the calculated weight of said object.

4,673,801

PTC HEATER ASSEMBLY

David F. Leary, Woodside, and Alan Brigham, Sunnyvale, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

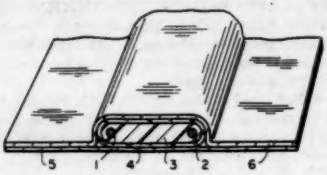
Continuation of Ser. No. 558,631, Dec. 5, 1983, Pat. No. 4,547,659, which is a continuation-in-part of Ser. No. 216,952, Dec. 16, 1980, Pat. No. 4,425,497, which is a continuation-in-part of Ser. No. 67,309, Aug. 17, 1979, abandoned. This application Jun. 28, 1985, Ser. No. 750,763
Int. Cl.[4] H05B 3/44
U.S. Cl. 219—544 9 Claims

1. A heater assembly which comprises

(a) a PTC heater which comprises at least one laminar PTC element of a conductive polymer composition, and at least two electrodes which are secured to a surface of the PTC element, which can be connected to a source to electrical power and which when so connected cause current to pass through said PTC element;

(b) an electrically insulating jacket which surrounds said PTC element and said electrodes; and

(c) an envelope which substantially surrounds and is in intimate thermal contact with said PTC heater which is electrically insulated from said PTC element and said



electrodes by said insulating jacket, and which is composed of a material having a thermal conductivity of at least 0.1 Cal/cm. °C. sec;

said heater assembly having an active power output at 50° F. which is at least 1.5 times the active power output at 50° F. of the PTC heater without the envelope.

4,673,802

SYSTEM FOR MAKING PAYMENTS FOR TRANSACTIONS

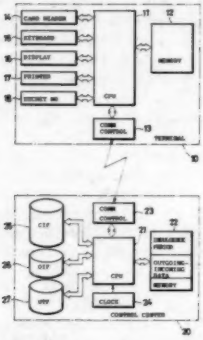
Kenichi Ohmae, Yokohama; Kazuma Tateisi, Kyoto; Yoshitsugu Shinohara, Shiga, and Nobuyuki Ueno, Nagaokakyo, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Continuation of Ser. No. 582,910, Feb. 23, 1984, abandoned. This application Oct. 21, 1986, Ser. No. 921,821

Claims priority, application Japan, Feb. 23, 1983, 58-22925

Int. Cl.[4] G06F *15/30*

U.S. Cl. 235—379 **5 Claims**



1. A system for making payments for transactions, comprising:

(a) a plurality of transaction terminals each having:

(i) a card reader for reading data from a bank card having recorded therein data relating to an account number of its user and data relating to a bank where the account of the user is provided,

(ii) means for entering data relating to sums of transactions, and

(iii) means for setting an account number of a store, and

(b) a central processing system operatively connected with said transaction terminals and having:

an account file including a file portion having stored therein data relating to the accounts of users and a file portion having stored therein data relating to the accounts of stores,

an outstanding transaction file for storing outstanding transaction data for at least a predetermined period of indulgence, said outstanding transaction data including sums of the transactions, account numbers of users, account numbers of stores provided by said transaction terminals and data relating to the transactions,

means for checking the transaction data on the outstanding transaction file to determine whether the predetermined period of indulgence has elpased from the data of each transaction, and

transfer means for withdrawing a sum of a transaction, which is associated with a lapse of the indulgence period, from the corresponding user account on the account file and adding the sum in the corresponding store account.

4,673,803

METHOD OF DETECTING AND EVALUATING IDENTIFICATION CODES ON CONTINUOUSLY MOVING WEBS

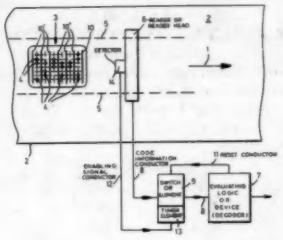
Ludwig Zerle, Paarstr. 3, 8905 Mering; Gerhard Brunner, Jägerbachstr. 4, and Otto Lorenz, Schwibbogenplatz 2b, both of 8900 Augsburg, all of Fed. Rep. of Germany

Filed Nov. 21, 1984, Ser. No. 673,781

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1983, 3342038

Int. Cl.[4] G06K *7/00*

U.S. Cl. 235—436 **12 Claims**



1. A method of scanning and processing identification marks on a continuously moving material web which carries such marks including codes in the form of code fields arranged on the material web, said method including the steps of:

providing a starter label for at least one code field at an upstream end thereof in the direction of movement of said web, said starter label being physically different from said material and independent of said one of said code fields and different from the marks thereof;

positioning a reading device including a reader head and connecting same to an evaluating logic device in such a way with respect to the continuously moving material web that a signal flow is produced at the reader head on passage thereat of at least one code field;

detecting upon passage of said starter label past said head immediately preceding commencement of passage of the code field at the reader head an initiating signal; and

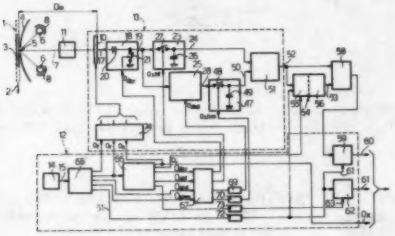
enabling said logic device to respond to said signal flow by initiating signal flow between the reader head and the evaluating logic device, with said initiating signal and discontinuing said signal flow when the respective code field has passed said head to thereby cutoff said head from said logic device.

4,673,804

ELECTRONIC GRAPHIC DETECTING HEAD

Paolo Filauro, and Giorgio Musso, both of Genoa, Italy, assignors to Elettronica San Giorgio - ELSAG S.p.A., Genova-Sestri, Italy

Filed Mar. 7, 1985, Ser. No. 709,074
Claims priority, application Italy, Mar. 9, 1984, 67222 A/84
Int. Cl.[4] G06K 7/10
U.S. Cl. 235—463 19 Claims



1. Electronic graphic detecting head comprising means (6) for lighting a zone (5) in which the said graphics may be presented, means (11) for focusing on detecting means (10) designed to convert light signals into electric analogue signals (17), and means (23, 25, 47, 51) designed to supply a digital conversion of the said analogue signals (17), characterised by the fact that the said means comprise a first threshold-generating block (23), designed to supply a comparator block (51) with a first signal (24) depending on the reflection of a support (3) bearing the said graphics, and a second block (25) for intensifying the difference in the value of the said analogue signal (19) from successively-scanning element on the said detecting means (10), and designed to supply a second signal (28) to the said comparator block (51) which supplies a third digital output signal (52) representing the said graphics wherein said second block (25) comprises means for generating an output signal (P_i) representative of the magnitude

$$P_i=(P_i-P_{i-1})k+P_i$$

where

P_i equals the value of the analogue signal (19);

i equals the scanning element on the detecting means (10); and

k equals a constant.

4,673,805

NARROW-BODIED, SINGLE- AND TWIN-WINDOWED PORTABLE SCANNING HEAD FOR READING BAR CODE SYMBOLS

Howard M. Shepard, Great River; Edward D. Barkan, South Setauket, and Jerome Swartz, Stonybrook, all of N.Y., assignors to Symbol Technologies, Inc., Bohemia, N.Y.

Division of Ser. No. 342,231, Jan. 25, 1982, Pat. No. 4,409,470.
This application Aug. 1, 1983, Ser. No. 519,523
Int. Cl.[4] G06K 7/10
U.S. Cl. 235—472 10 Claims

1. In a scanning system for reading bar code symbols, a system control arrangement comprising:

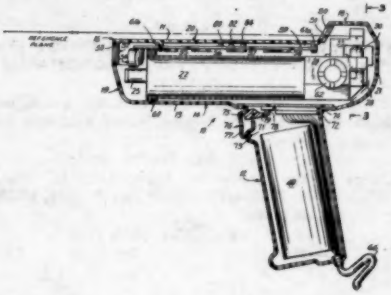
(a) a scanning head;

(b) actuatable light source means mounted within the head, for generating an incident light beam, and for directing the incident beam along a light path towards a reference plane located exteriorly of the head, and towards a bar code symbol located in the vicinity of the reference plane to thereby generate reflected light of variable intensity which travels away from the symbol and back towards the head;

(c) actuatable scanning means mounted within the head, for scanning at least one of the incident beam and the reflected light across the bar code symbol;

(d) actuatable sensor means mounted within the head, for detecting the variable light intensity of the reflected light, and for generating an electrical signal indicative of the detected light intensity;

(e) actuatable signal processing means mounted within the head, for processing the electrical signal to generate therefrom data descriptive of the bar code symbol; and



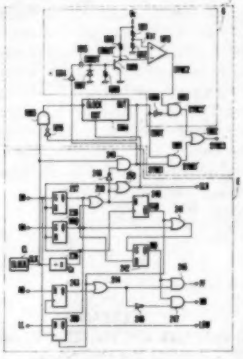
(f) control means for substantially simultaneously actuating all the actuatable means in the head during symbol reading, and for substantially simultaneously deactuating all the actuatable means in the head when the symbol is not being read, whereby power consumption to the actuatable means in the head is substantially minimized.

4,673,806

AUTOMATIC FOCUS ADJUSTING DEVICE

Takashi Amikura, Tokyo, and Akihiro Fujiwara, Kanagawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 10, 1984, Ser. No. 679,909
Claims priority, application Japan, Dec. 13, 1983, 58-234600
Int. Cl.[4] G01J 1/20
U.S. Cl. 250—201 10 Claims



1. A device for measuring distance of an object, comprising:

(a) a pulse generator for generating a plurality of pulses;

(b) control means for changing width of the pulses of the pulse generator;

(c) light emitting means for emitting light in response to the pulses changed by said control means;

(d) receiving means for receiving light emitted by said light emitting means and reflected by said object; and

(e) operating means for determining the distance of the object on the basis of the light received by said light receiving means.

4,673,807

AUTOMATIC RANGE CONTROL METHOD FOR AN OPTICAL DENSITY/DOT PERCENTAGE MEASURING DEVICE

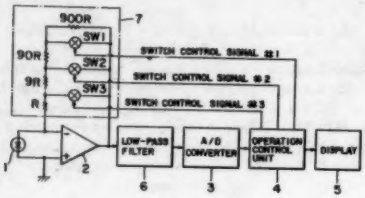
Yuji Kobayashi, Ageo, and Norio Takahashi, Tokyo, both of Japan, assignors to Dai Nippon Insatso Kabushiki Kaisha, Japan

Filed Oct. 8, 1985, Ser. No. 785,503

Claims priority, application Japan, Oct. 12, 1984, 59-153809[U]; Nov. 2, 1984, 59-230399; Nov. 2, 1984, 59-230400; Nov. 2, 1984, 59-230401

Int. Cl.[4] H01J 40/14; G01N 21/00

U.S. Cl. 250—214 AG 9 Claims



7. An optical density/dot percentage measuring device comprising: a photoelectric conversion element for photoelectrically converting a transmitted or reflected light of an object to be measured into a photocurrent; an operational amplifier for converting said photocurrent into a voltage signal for amplifying said voltage signal; a low-pass filter for cutting off an AC component of said voltage signal from said operational amplifier; an A/D converter for converting said voltage signal from said low-pass filter from an analog value into a digital value; an operation control unit for outputting, in response to said digital signal, switch control signals for the control of an on/off state of a plurality of analog switches and a data signal representative of data to be displayed; a display for displaying said data; and a gain switching circuit having a plurality of feedback resistors connected in series between the input and output terminals of said operational amplifier, said analog switches being respectively connected between the terminals of said feedback resistors except that connected to the input terminal of said operational amplifier, and the output terminal of said operational amplifier.

4,673,808

DISC FOR ROTARY ENCODER AND METHOD FOR PRODUCING SAME

Takashi Katohno, and Ryouhei Koyama, both of Hyuga, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

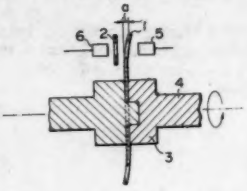
Filed Oct. 2, 1985, Ser. No. 783,081

Claims priority, application Japan, Oct. 17, 1984, 59-216387

Int. Cl.[4] G01D 5/34

U.S. Cl. 250—231 SE 17 Claims

1. A rotary disc for an optical rotary encoder, wherein said rotary disc is made of nickel-phosphorous alloy, the diameter of said rotary disc being in a range of 15 mm to 50 mm, the thickness of said rotary disc being in a range of 20 μm to 200



μm, said rotary disc having between 200 to 1,500 slits therein, wherein warp of said rotary disc is not greater than 100 μm.

4,673,809

OPTOELECTRONIC SCANNING ARRANGEMENT WHEREIN OPTICAL REFLECTIVE MARKINGS FORM CURVILINEAR ARCS

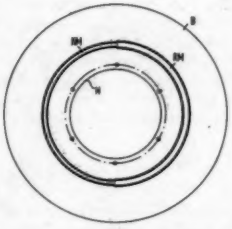
Jürgen Geyer, Puchheim, and Ernst Kegler, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 585,489, Mar. 2, 1984, abandoned. This application Aug. 18, 1986, Ser. No. 899,184

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1983, 3310394

Int. Cl.[4] G01D 5/34

U.S. Cl. 250—231 SE 4 Claims



1. In an optoelectronic scanning arrangement for scanning optical markings which are movable relative to a photoelectric cell having a light source and a light receiver, the light source and optical receiver being located on the same side of the optical markings, the improvement wherein said markings comprise curvilinear arcs, in particular, a first mark (RM) with a reflective surface which reflects a pencil of rays radiated from said light source (LS) onto said light receiver (LE) and a second mark (NM) with a reflective surface which is inclined by an angle (W) relative to the longitudinal axis of the pencil of rays, so that said pencil of rays is not reflected toward said light receiver (LE) by said second mark.

4,673,810

INCREMENT SENSING WITH THREE BEAM MARK DETECTION

Alfred Babsch, Ulm; Dieter Beth, Thalfingen; Werner Panzer, Senden, and Johann Stempfle, Pfaffenhofen, all of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed May 15, 1985, Ser. No. 734,674

Claims priority, application Fed. Rep. of Germany, May 19, 1984, 3418798

Int. Cl.[4] G01D 5/34

U.S. Cl. 250—231 SE 11 Claims

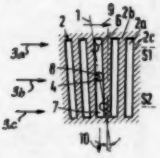
1. In a device for digital control of a machine or movable

equipment part under utilization of a drive asociated with an optical electronic increment sensor, the improvement comprising:

a plurality of parallel track defining means with each track being defined by alternately translucent or transparent and opaque incremental marking sections;

means defining a corresponding plurality of groups of three separate beams each, the beam of each group traversing one of each said of the increment track means, two beams of each group being close to opposite outer borders of the respective track marking and a third one of the group of beams traverses the respective center of that track;

said beams of any of said groups being arranged so that projections of the beams of the respective group into a plane of the respective track result in scanning dots being



arranged along a line having an oblique angle in relation to the direction of extension of the respective track marking sections;

three beam combining means, respectively (i) combining the beams of all groups having traversed one border of each marking of the plurality of tracks (ii) combining the beams of all groups having traversed another border of each said marking of the plurality of tracks; and (iii) combining all beams of the groups having traversed the respective track centers; and

pickup means for separately detecting illumination from the three beams as modulated by said marker tracks and as combined as per (i), (ii), and (iii) and providing separate electrical signals respectively representing passage of one border of all tracks, of another border of all tracks, and of the center of all tracks.

4,673,811

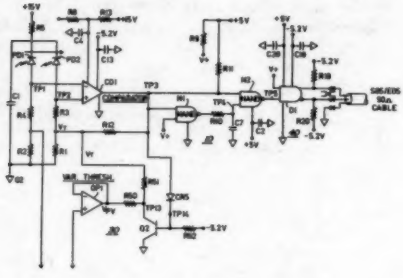
VARIABLE THRESHOLD SCAN DETECTOR UTILIZING CROSSOVER POINTS ON PHOTODETECTORS OF THE LASER BEAM TO MONITOR THE THRESHOLD

Floyd W. Looschen, Laguna Beach, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 5, 1985, Ser. No. 804,965

Int. Cl.[4] H04N *1/10*

U.S. Cl. 250—235 **3 Claims**



1. A threshold scan detector utilized in raster output scan light beam systems, comprising

first and second photodetector means (PD1, PD2) in the path of the output scan beam, said first photodetector means (PD1) emitting a first electric signal and said second photodetector means (PD2) emitting a second electric signal,

comparator circuit means (CO1) coupled to said first and second photodetector means for generating a third electrical signal when said first and second electrical signals crossover in value, the second of said crossovers accurately indicating when said scan beam is directly in the center of said first and second photodetector means,

logic circuit means (10) coupled to said comparator circuit means (CO1) for generating a fourth electrical signal when said second crossover signal occurs,

driver circuit means (40) coupled to said logic circuit means (10) for generating a drive signal representing a precise start of scan or end of scan signal,

peak detector circuit means (20) for detecting and storing the peak signal voltage of the scan light beam detected by said first photodetector means, and variable threshold circuit means (30) coupled to said peak detector circuit means (20) for monitoring the value of the peak signal voltage and generating a variable threshold signal at a predetermined percentage of said peak signal voltage, said variable threshold signal being couled back to the input of said comparator circuit means for maintaining the threshold level of operation of said comparator circuit means at said predetermined percentage of said peak signal voltage.

4,673,812

CALIBRATING MECHANISM OF AN INFRARED ANALYZER

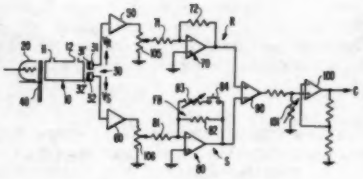
Aritoshi Yoneda, Kyoto, Japan, assignor to Horiba, Ltd., Kyoto, Japan

Filed May 30, 1985, Ser. No. 740,056

Claims priority, application Japan, Jul. 9, 1984, 59-143169

Int. Cl.[4] G01D *18/00*; G01N *21/61*

U.S. Cl. 250—252.1 **2 Claims**



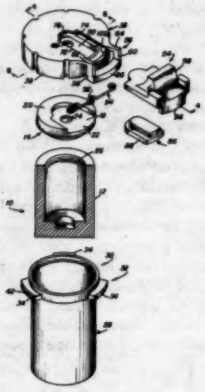
1. A calibrating mechanism of an infrared analyzer having a reference wavelength detector connected to a reference signal amplifier and a measurement wavelength detector connected to a measurement signal amplifier, outputs of said two amplifiers being subtracted so as to generate an analyzer output, said mechanism comprising a gain adjusting means connected to said measurement amplifier for setting a gain thereof at one of a first and a second value, wherein, when said gain adjusting means sets the gain of said measurement amplifier to said first value, a zero calibration is effected with a zero gas flowing through said analyzer and a span calibration is effected with a span gas flowing through said analyzer and wherein, when said gain adjusting means sets the gain of said measurement amplifier to said second value, said analyzer output with said zero gas flowing through said analyzer is equal to said analyzer output with said span gas flowing through said analyzer when the gain of said measurement amplifier was set at said first value, such that said analyzer may be subsequently recalibrated using only said zero gas.

4,673,813

MULTI-DOSE RADIO-ISOTOPE CONTAINER

Lawrence Sanchez, Albuquerque, N. Mex., assignor to Nuclear Medical Products, Inc., Los Lunas, N. Mex.

Filed May 30, 1985, Ser. No. 739,145
Int. Cl.[4] G21F 5/00
U.S. Cl. 250—506.1 9 Claims



1. A multi-dose container for radio isotopes, said container comprising a first hollow body formed of a material substantially impervious to radiation and having a first cover sealed thereto, said first cover being substantially impervious to radiation and having a formed depression in the upper surface thereof, said depression containing a first aperture communicating with the interior of said first body; a second body having a hollow cavity formed to receive said first body; a second cover for closing said second body; a dependent boss formed on the interior surface of said second cover, said boss having a configuration formed to match the formed depression in said first cover; a second aperture in said boss in alignment with said first aperture; a slidable portion formed to engage an opening in the upper surface of said second cover; and slidable portion holding and releasing means on said second cover.

4,673,814

CONTAINER FOR RECEIVING AND SAFELY STORING RADIOACTIVE MATERIALS AND METHOD FOR TIGHTLY SEALING THE SAME

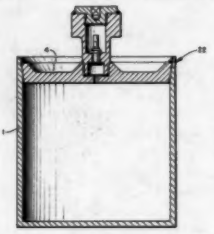
Guenter Schroeder, Wetter; Guenther Dudek, Visselhoevede, and Heinolf Schrader, Bruchhausen, all of Fed. Rep. of Germany, assignors to Deutsche Gesellschaft für Wiederaufarbeitung von Kernbrennstoffen mbH, Hanover, Fed. Rep. of Germany

Filed Sep. 10, 1982, Ser. No. 416,679
Claims priority, application Fed. Rep. of Germany, Sep. 28, 1981, 3138485
Int. Cl.[4] G21F 5/00
U.S. Cl. 250—506.1 12 Claims

1. A container for receiving and safely storing radioactive materials or other materials damaging to living organisms such as vitrified radioactive fission products or irradiated nuclear reactor fuel elements, the container comprising:

a vessel for receiving the materials to be stored therein, the vessel including a base and a wall extending upwardly from said base, said wall terminating in a circular rim defining the opening of the vessel through which the materials to be stored therein are passed, said wall defining an inner wall surface having an upper surface portion diverging outwardly away from the remainder of said inner wall surface to define a conical seating surface communicating with said rim;

a sealing cover pressable into said vessel thereby exerting a radial force thereagainst and closing off the latter from the ambient, said cover having a massive unyielding peripheral portion defining an outer peripheral surface for engaging said vessel seating surface when the sealing cover is pressed into said vessel, said peripheral surface converging toward the interior of said vessel to define a conical surface having a taper corresponding to the taper of said vessel seating surface whereby said conical surfaces coact to provide a seal fit between said vessel and said sealing cover;



said wall of said vessel having a thickness at said conical sealing surface thereof selected to permit said wall to respond to said radial force to fit approximately evenly to said conical surface of said cover thereby contributing to the integrity of said seal fit;

said conical surface being smooth and uninterrupted so as to unrestrictingly receive said cover thereagainst as the latter is pressed downwardly into said vessel so as to permit development of said radial force fit; and,

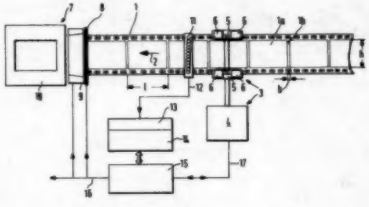
a weld joining said sealing cover to said vessel, said weld being in the form of a fused-mass joint extending around the entire periphery of said sealing cover.

4,673,815

METHOD OF AUTOMATICALLY DETECTING THE LOCATIONS OF THE FRAME LINES OF A REVERSAL FILM AND APPARATUS FOR CARRYING OUT THE METHOD

Rupert Fruth; Gottfried Stemmer, both of Garmisch-Partenkirchen, and Claus Pohl, Eschenlohe, all of Fed. Rep. of Germany, assignors to Geimuplast Peter Mundt GmbH & Co. KG, Farchant, Fed. Rep. of Germany

Filed Sep. 19, 1985, Ser. No. 777,924
Claims priority, application Fed. Rep. of Germany, Oct. 8, 1984, 3436874
Int. Cl.[4] G01N 21/86; G03B 1/00
U.S. Cl. 250—548 8 Claims



1. A method of automatically detecting the locations of the frame lines of a reversal film as it is supplied to a processing station, such as a cutting and mounting station, a notching

station or the like, so that the frame lines can be used as reference marks for the positioning of the film in the processing station, wherein the film is moved past optoelectronic scanning means in steps which amount to only a fractional part of the normal width of a frame line, said optoelectronic scanning means generate an analog voltage which represents the accumulated light transmission of the film in a scanning area which extends at right angles to the direction of travel of the film substantially across the picture area of the film and has a width which is only a fractional part of a normal width of a frame line, and the extreme value of said voltage obtained during a scanning of at least one normal frame length and corresponding to the lowest light transmission is evaluated as a representation of the light transmission of the scanned film at a frame line, characterized by

(a) digitizing the analog voltage and storing the digital data obtained for each step of travel for an interval of tiem which corresponds to the travel over a plurality of frame lengths, and

(b) comparing the digital data which are stored at a time with each other and recognizing a frame line by determining digital data which represent the extreme voltage value when the number of such data which occur in an uninterrupted sequence corresponds to a frame line width, within a predetermined tolerance allowance, and recognizing an unexposed frame area if a larger number of such data occur in an uninterrupted sequence.

4,673,816

METHOD FOR INSPECTING A PATTERN AND AN APPARATUS FOR INSPECTING A PATTERN

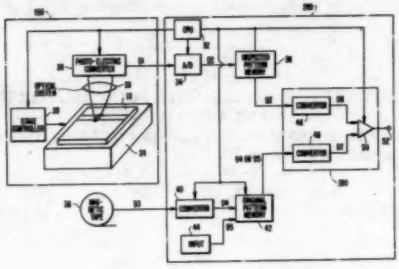
Showgo Matsui, Sagamihara, and Kenichi Kobayashi, Tokyo, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 27, 1984, Ser. No. 686,896

Claims priority, application Japan, Dec. 27, 1983, 58-249318

Int. Cl.⁴ G06K *9/64*; G06F *15/336*

U.S. Cl. 250—556 **2 Claims**



1. A method for inspecting a pattern by collating and comparing a signal obtained by scanning a mask substrate having a high density pattern including repeated pattern portions and a signal obtained from original data corresponding to the high density pattern and stored in a memory means, comprising the steps of:

(a) repeatedly collating and comparing inspected pattern data corresponding to the signal obtained by scanning said mask substrate and repeated original pattern data corresponding to a basic pattern of said repeated pattern portions for inspecting said repeated pattern portions, the repeated pattern original data being stored in the memory means and used repeatedly for comparison to the repeated pattern portion; and

(b) collating and comparing inspected pattern data and original pattern data, obtained by sequentially converting said original data, in synchronization with said scanning of said mask substrate, for inspecting high density pattern portions other than said repeated pattern portions.

4,673,817

MEASURING SYSTEM FOR CONTACTLESS MEASURING THE DISTANCE BETWEEN A PREDETERMINED POINT OF AN OBJECT SURFACE AND A REFERENCE LEVEL

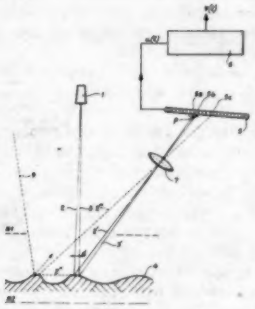
Gijsbert L. Oomen, Pijnacker, Netherlands, assignor to N.V. Optische Industrie de Oude Delft, Netherlands

Filed May 21, 1985, Ser. No. 736,561

Claims priority, application Netherlands, May 23, 1984, 8401649

Int. Cl.⁴ G01B *11/30*

U.S. Cl. 250—561 **7 Claims**



1. A system for measuring without contact the distance between a region of an object surface and a reference level using trigonometric principles comprising:

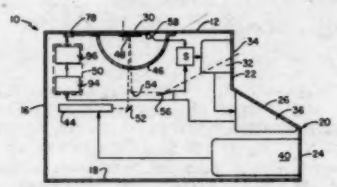
transmitting means including a source of radiation for transmitting measuring beams of radiation to the limited observation region of the object surface for reflection therefrom in a desired direction;

receiving means in fixed relation to said reference level including detection means for receiving the radiation reflected in said desired direction and focusing means for focusing radiation reflected from said region of the object surface in the desired direction, said detection means having a limited position-sensitive linear region where it is radiation sensitive and the focusing means being adapted to focus, as spots on the radiation sensitive region, radiation reflected only from the limited observation region of the object surface, characterized in that the source of radiation emits at least two beams along paths that are essentially parallel and separated by a prescribed distance when incident on the object surface, the prescribed distance being such that the two beams, after reflection from the limited observation region and traversal of the focusing means, are separate spots on the linear radiation sensitive region of the detection means and there is further included signal processing means, to which is supplied an output of the detecting means and which can select for further processing output signals which correspond to the spots, which are spaced apart along the radiation sensitive region a distance which is related in known fashion to the distance separating the beams.

4,673,818
ROUGHNESS MEASURING APPARATUS

John M. Guerra, Concord, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Nov. 25, 1985, Ser. No. 801,402
Int. Cl.[4] G01B 9/00
U.S. Cl. 250—571 23 Claims



1. Apparatus for measuring roughness of a sample surface, said apparatus comprising:

means defining an interior hemispheric reflecting surface opening at an equatorial plane and concentric with a polar axis perpendicular to said plane, said reflective surface having an aperture near the intersection of said reflecting surface and said polar axis;

means for positioning the sample surface and said reflecting surface so that the sample surface lies near said equatorial plane;

means for directing a beam of light through said aperture to the sample surface so that specular light reflected from the sample surface passes back through said aperture;

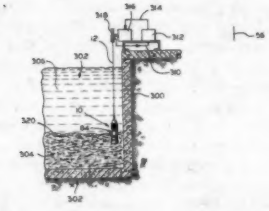
a specular sensor positioned outside of said hemispheric reflecting surface for providing a signal corresponding to the intensity of specular light reflected from the sample surface; and

a scatter sensor for providing a signal corresponding to the intensity of scatter light reflected from the sample surface and focused by said interior hemispheric reflecting surface at said equatorial plane, said scatter sensor comprising a wafer-thin light responsive cell having a light sensitive area approximating the area defined by scatter light focused by said hemispheric reflecting surface at said equatorial plane.

4,673,819
SENSING PROBE FOR SLUDGE DETECTORS

Thomas A. Rose, LaGrange, Ill., assignor to Ecolotech, Inc., LaGrange, Ill.

Filed Aug. 1, 1985, Ser. No. 761,433
Int. Cl.[4] G01N 21/01
U.S. Cl. 250—573 15 Claims



1. A sensing probe for sludge detectors adapted to be connected to the end of an insulated cable and immersed in liquids to sense sludge levels therein, said probe comprising:

an elongate cylindrical housing having upper and lower ends and defining a centrally disposed longitudinally extending axis and a cylindrical peripheral side wall,

said housing defining intermediate its ends a reentrant indentation at one side of said housing interrupting its said side wall and forming a pair of opposed spaced apart housing walls and a gap in said housing side wall separating said housing opposed walls,

a source of illumination mounted in sealed relation to said housing in one of said housing walls,

a light sensitive device mounted in sealed relation to said housing in the other of said housing walls,

said source of illumination and said light sensitive device being both lens covered, and being disposed in opposed relation lengthwise of said housing and across said gap in light transmitting relation therebetween,

said housing upper and lower ends each defining a tubular stud portion,

a lower end cap threaded on said housing lower end stud portion in sealed relation to said housing,

said lower end cap being seated in a dished elastomeric bumper,

means for frictionally retaining said bumper on said lower end cap,

an upper end cap threaded on said housing upper tubular stud portion in sealed relation to said housing and defining an upstanding stud portion at the upper end thereof having a through bore with an annular internal sealing surfacing adjacent the upper end of said upper end cap stud portion,

an elastomeric grommet seated against said upper end cap stud portion sealing surfacing and having an upper bearing surface,

a gland ring seated on said grommet bearing surface,

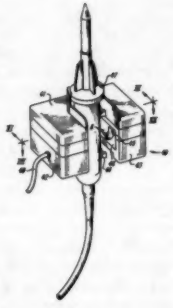
a nut member threaded on said upper end cap stud portion and having an annular internal surface for compressing said gland ring against said grommet to bias said grommet in sealing relation to said upper end cap stud portion sealing surface,

and protective means mounted on said housing and spanning said indentation for shielding said lenses from breakage and being configured to accommodate free liquid intrusion within said indentation.

4,673,820
DROP DETECTING SYSTEM WITH FOCUSING MIRROR ELEMENT AND VIBRATOR

Dean L. Kamen, Bedford, N.H., assignor to Baxter Travenol Laboratories, Deerfield, Ill.

Filed Nov. 7, 1984, Ser. No. 669,108
Int. Cl.[4] G01N 15/06
U.S. Cl. 250—573 12 Claims



1. An improved drop monitoring system, of the type having a light source and a light detector with an optical path therebetween for detecting drops falling along a drop fall path across

the optical path from the source to the detector, wherein the improvement comprises:

a mirror element located in the optical path and configured so as to focus the source light onto the detector,

the mirror element having a reflective surface in the shape of a band, the reflective band disposed transversely to the drop fall path and having a width, in a direction co-planar with the drop fall path, the width generally approximating the length of a falling drop, so that a falling drop occludes a substantial portion of the width of the band.

4,673,821

PHOTOELECTRIC CONVERTER DEVICE HAVING REDUCED OUTPUT NOISE

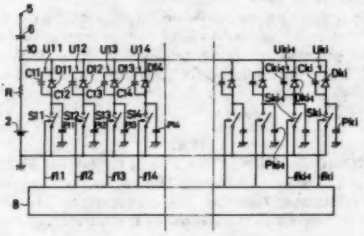
Keitoku Morita, Kagoshima, Japan, assignor to Kyocera Corporation, Kyoto, Japan

Filed Sep. 26, 1984, Ser. No. 654,766

Claims priority, application Japan, Sep. 27, 1983, 58-179801; Dec. 29, 1983, 58-248138

Int. Cl.⁴ H04N *3/14, 5/335*

U.S. Cl. 250—578 **17 Claims**



11. A document reading apparatus having a plurality of fundamental circuits for reducing output noise, each fundamental circuit comprising:

a photoelectric converter unit having a photoelectric diode and means for storing electric charges, the photoelectric diode and charge storing means are coupled in parallel;

a switch;

a DC power supply; and

an impedance means for providing load resistance;

wherein the photoelectric converter unit, the switch, the DC power supply and the impedance means are coupled in series in that order in a loop, wherein the DC power supply applies a voltage in reverse bias across the photoelectric unit, and wherein an output voltage signal is readable at a point between the impedence means and the photoelectric converter unit.

4,673,822

WIND ELECTRIC GENERATOR

Naomi Kikuchi, 206 Kamiyachi, Niigata 951, Japan

Filed Oct. 17, 1985, Ser. No. 788,462

Int. Cl.⁴ F03D *7/02*

U.S. Cl. 290—44 **4 Claims**

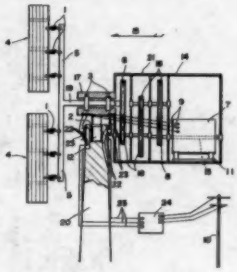
1. A power electric generator comprising:

(a) a power shaft having a horizontal axis of rotation and a support column, said power shaft rotatably coupled to said support column for free rotation about a vertical axis;

(b) a plurality of spokes radially extending from said power shaft;

(c) a plurality of springs having first and second ends, with first ends connected to said spokes;

(d) a plurality of wind mill blades, each blade spaced apart from said spokes by at least one spring, said springs having said second ends supporting said blades and biasing said blades in a first extreme position facing typical air currents for rotation of said power shaft about said horizontal axis and about said vertical axis to align said power shaft parallel the direction of the air current, said springs providing a force such that storm type air currents move said wind mill blades to a second extreme position parallel to said storm type air currents,



said power shaft rotation about the horizontal axis causing rotation of a main shaft of an electric generator.

4,673,823

APPARATUS FOR OPERATING CYCLOCONVERTERS IN PARALLEL FASHION

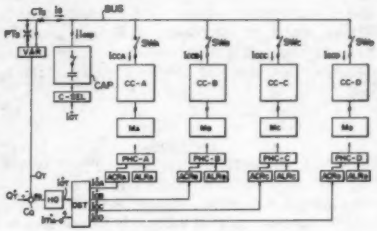
Shigeru Tanaka, Tama, Japan, assignor to Katushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 27, 1985, Ser. No. 813,879

Claims priority, application Japan, Dec. 28, 1984, 59-274716; Jul. 31, 1985, 60-167714

Int. Cl.⁴ H02P *13/30*

U.S. Cl. 307—11 **12 Claims**



1. An apparatus for operating cycloconverters in a parallel fashion comprising:

(a) an ac power supply,

(b) a plurality of circulating current type cycloconverters connected in parallel to said ac power supply,

(c) a plurality of loads receiving power from said respective cycloconverters,

(d) a power factor compensating capacitor assembly comprising a plurality of capacitors collectively connected at a receiving end of said ac power supply,

(e) means for controlling output currents of said respective cycloconverters,

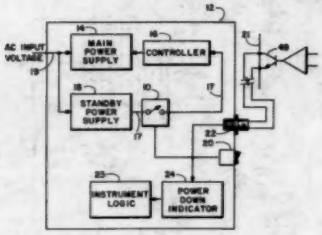
(f) means for controlling circulating currents of said respective cycloconverters, and

(g) means for delivering circulating current command values to said means for controlling the circulating currents of said respective cycloconverters for controlling a total reactive power of said receiving end of said ac power supply.

4,673,824
POWER SUPPLY SWITCH CIRCUIT

Steven H. Pepper, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Mar. 3, 1986, Ser. No. 835,492
Int. Cl.[4] H02J 9/06
U.S. Cl. 307—64 6 Claims



1. A switch circuit for enabling and disabling power within a electrical instrument, comprising:

a current path having a first portion and a second portion;

transistor means for switchably connecting the portions of the current path, the means having an input connected to the first portion and an output connected to the second portion;

a standby power supply connected to the first portion of the current path and a power supply controller for a main power supply connected to the second portion, the current from the standby power supply being transmitted through the transistor means for enabling the power supply controller to control the main power supply;

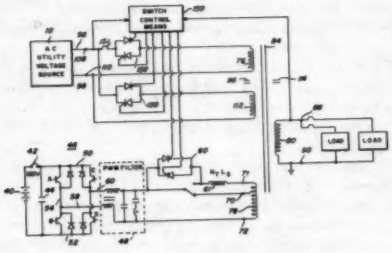
switch means coupled to the transistor means for signaling the transistor means to electrically connect and disconnect the portions of the current path; and

temporary current source means coupled to the output portion of the transistor means for providing current to the second portion of the current path for a predetermined time after the switch means signals the transistor means to disconnect the first and second portions of the current path.

4,673,825
UNINTERRUPTIBLE POWER SUPPLY WITH ISOLATED BYPASS WINDING

William J. Raddi; Robert W. Johnson, Jr.; John G. Tracy, and Blazej W. Sonnenberg, all of Raleigh, N.C., assignors to Exide Electronics Corporation, Raleigh, N.C.

Filed Feb. 15, 1985, Ser. No. 702,313
Int. Cl.[4] H02J 9/06
U.S. Cl. 307—66 8 Claims



1. A stabilized power supply system for supplying alternating current power to a critical load, such as a computer, comprising:

(a) transformer means including an output winding connected with the load, and first and second input windings;

(b) first source means including a battery and an inverter for supplying alternating-current power;

(c) second source means including a bypass voltage source for supplying alternating current power;

(d) transfer switch means having first and second conditions for alternately connecting and disconnecting said first source with said first input winding and for disconnecting and connecting said second source with said second input winding, respectively;

(e) third source means including a utility voltage source for supplying alternating-current power to said transformer means; and

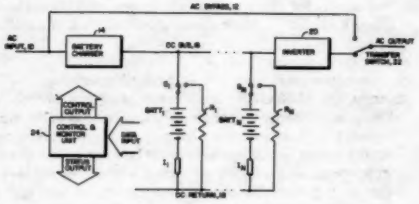
(f) means for varying the angular vector relationship between the voltages of said third (E_U) and first (E_I) sources to cause the real component of the inverter current (I_I) at the break-even condition to be a minimum, said vector relationship varying means comprises magnetic shunt means (M) for varying the coupling between the windings of said transformer means;

(g) said transformer means also including a third input winding connected with said utility voltage source, said magnetic shunt means being arranged to at least partially isolate said third winding from said first and second windings.

4,673,826
AUTONOMOUS UNINTERRUPTABLE POWER SUPPLY APPARATUS

James H. Masson, Littleton, Colo., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 20, 1984, Ser. No. 684,240
Int. Cl.[4] H02J 7/00
U.S. Cl. 307—66 1 Claim



1. An autonomous uninterruptable power supply apparatus comprising in combination:

a means for charging, said charging means receiving an AC input signal, said charging means providing a DC output signal,

an inverter means connected directly to said charging means by a DC bus line, said inverter means receiving a DC input signal and providing an AC output signal in response thereto,

a switching means having a switchable first and second input terminal and an output terminal, said first input terminal connected to the output of said inverter means, said second input terminal connected to the input of said charging means by an AC bypass line to receive said AC input signal,

a plurality of DC supply means respectively connected in parallel between said DC bus line and a DC return line, said charging means simultaneously providing a DC output signal to both said inverter means and said plurality of DC supply means, said charging means charging said plurality of DC supply means simultaneously in parallel to

respectively maintain a predetermined voltage level thereon, said plurality of DC supply means respectively comprise:

a switch means with a switchable first and second terminal and an output terminal, said first terminal connected to said DC bus line,

a battery means with a positive and negative terminal, said positive terminal connect to said output terminal of said switch means,

a current sensing means connected between said negative terminal and said DC return line, and

an impedance means connected between said second terminal of said switch means and said DC return line, said switch means operating under the control of said control/-monitor means, said control/monitor means operating said switch means to said first terminal to charge said battery means, said control/monitor means operating said switch means to said second terminal to test the capacity of said battery means by connecting said impedance means in parallel with said battery means and said current sensing means, and,

a control/monitor means operatively connected to said charging means, said inverter means, said plurality of DC supply means and said switching means, said control/-monitor means monitoring the output voltage of said charger means, said inverter means and said plurality of DC supply means, said control/monitor means sensing the current capacity of said plurality of DC supply means, said control/monitor means respectively providing control signals to said charger means, said inverter means, said switch means and said plurality of DC supply means, said control/monitor means providing system status output signals, said control/monitor means comprises:

a data acquisition means to receive the input parameters from said charging means, inverter means, and said plurality of DC supply means, said data acquisition means converting said input parameters from analog to digital to provide digital data,

a central processor means receiving said digital data from said data acquisition means, said central processor means operably connected to a clock means to establish system timing, said central processor means generating output commands,

a programmable read only memory means operably connected to said central processor means, said programmable read only memory means storing operating parameters for use in said central processor means,

a random access memory means operably connected to said central processor means, said random access memory means storing program variables which are used in said central processor means,

a control output interface means operably connected between said central processor means and said charging means, said inverter means, said plurality of DC supply means, and said switching means, said control output interface means applying said output commands from said central processor unit to said charging means, said inverter means, said plurality of DC supply means, and said switching means, and

a status output interface means operably connected to said central processor means to provide system status output signals.

4,673,827

PROXIMITY SWITCH INSENSITIVE TO INTERFERENCE FIELDS

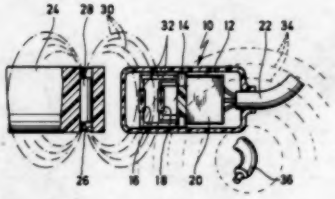
Gerhard Sommer, Kohlberg, Fed. Rep. of Germany, assignor to Gebhard Balluff Fabrik Feinmechanischer Erzeugnisse GmbH & Co., Neuhausen, Fed. Rep. of Germany

Filed Oct. 15, 1985, Ser. No. 787,450

Claims priority, application Fed. Rep. of Germany, Oct. 18, 1984, 3438120

Int. Cl.[4] H01H *36/00*

U.S. Cl. 307—116 **11 Claims**



1. A proximity switch for detecting position of a machine element provided with a magnet, comprising:

at least two sensors which respond to an approach of said machine element by varying electrical output characteristics of said sensors, said sensors comprising magnetic field sensors which are affected by magnetic fields, and said sensors being arranged in spaced relation to one another in such a way that one of said sensors is at a smaller distance from said machine element than the other sensor when said machine element is in a position to be detected,

a differential circuit to which said sensors are connected for generating a differential signal from said electrical output characteristics of the sensors to compensate for signals generated by interference fields, said sensors being so arranged relative to the machine element and having such a distance between said sensors and said machine element that the differential signal caused by the machine element when the machine element is in said position to be detected is greater than the differential signal generated due to said interference fields, and

a circuit associated with said sensors for converting said differential signal into an output signal for the proximity switch.

6. A proximity switch for detecting position of a machine element, comprising:

at least two sensors being coils of oscillatory circuits of oscillators dampable by an approach of said machine element and varying electrical output characteristics of said sensors accordingly, said sensors being affected by interference fields, and being arranged in spaced relation to one another in such a way that one of said sensors is at a smaller distance from the machine element than the other sensor when said machine element is in a position to be detected, and being connected for generating differential signals from said electrical output characteristics of the sensors to compensate for signals generated by said interference fields, and

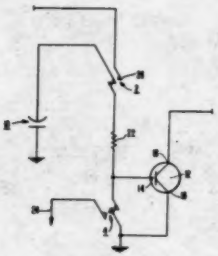
a circuit associated with said sensors for converting the differential signals into output signals for the proximity switch having a rectifier circuit associated with each of said oscillators, each rectifier circuit rectifying voltages tapped at the oscillator and forming a mean value and transmitting said mean value to a differential circuit for generation of said differential signals, said sensors being so arranged relative to said machine element and having such a distance between said sensors and said machine element that the differential signal caused by said machine element in said position to be detected is greater than the differential signal generated due to the interference fields.

4,673,828

COIN OPERATED SWITCH

John Marlow, N. Charleston, S.C., assignor to Holliday Amusement Company, Inc. of Charleston, Charleston, S.C.

Filed Apr. 8, 1985, Ser. No. 721,277
Int. Cl.[4] H01H 47/32; G07F 11/00
U.S. Cl. 307—139 5 Claims



1. A theft retarding coin operated actuator for use with coin operated machines which grant credits by grounding a circuit, comprising:

a. a first switch means which is actuated in response to a coin passing through said switch means and which returns to a normal position after said coin has passed through said switch means;

b. a capacitor which is charged upon actuation of said first said means, and which discharged upon the return of said first switch means;

c. a transistor having a base, a collector, and an emitter, with the base being capable of receiving said charge from said capacitor as said capacitor discharges, with the collector being connected to a credit circuit from said coin operated machine, and said emitter being connected to a ground;

d. a resistor which regulates the rate of discharge of said capacitor; and

e. a second switch means which receives said coin subsequent to said first switch means and which is actuated in response to said coin passing through said control means and which returns to its normal position after said coin has passed, allowing said charge from said capacitor to charge said base of said transistor and cause said credit circuit to ground through said collector and emitter if said second switch means is actuated during the discharge of said capacitor, and which causes said charge to be grounded if said second switch means is not actuated during said discharge of said capacitor, preventing said credit circuit from grounding through said transistor.

4,673,829

CHARGE PUMP FOR PROVIDING PROGRAMMING VOLTAGE TO THE WORD LINES IN A SEMICONDUCTOR MEMORY ARRAY

Anil Gupta, Sunnyvale, Calif., assignor to Seeq Technology, Inc., San Jose, Calif.

Continuation of Ser. No. 346,891, Feb. 8, 1982, Pat. No. 4,511,811. This application Feb. 8, 1985, Ser. No. 699,551
The portion of the term of this patent subsequent to Apr. 16, 2002, has been disclaimed.
Int. Cl.[4] H03K 19/094, 19/20, 4/02; G11C 8/00
U.S. Cl. 307—296 A 1 Claim

1. An apparatus for selectively increasing the voltage on one or more of a plurality of conductive lines having inherent distributed capacitance disposed in a semiconductor circuit including:

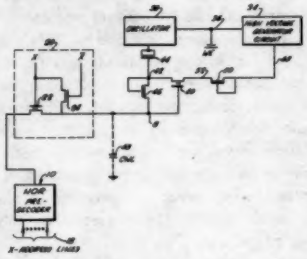
means disposed on said semiconductor circuit for selecting one or more of said conductive lines;

switchable high voltage generating means disposed on said semiconductor circuit for generating a high voltage from a lower voltage power supply connected to said semiconductor circuit,

switchable voltage pulse generating means disposed on said semiconductor circuit for generating voltage pulses;

means for capacitively coupling voltage pulses from said voltage pulse generating means to a voltage node in said semiconductor circuit,

transfer means responsive to said selecting means and connected to said voltage node for transferring increments of charge from said high voltage generating means to the



inherent distributed capacitance in selected ones of said conductive lines in response to said voltage pulses,

said transfer means including switching means cooperating with said selecting means for blocking substantially all of the flow of current through and transfer of charge from said high voltage generating means to said conductive lines which are unselected,

means connected to said high voltage generating means and said voltage pulse generating means for enabling them in response to a write enable signal.

4,673,830

BIASING NETWORK FOR MULTIFUNCTION BIPOLAR INTEGRATED SYSTEM

Valerio Giorgetta, Turin; Vanni Poletta, Camino; Mario Sartori, Turin, and Marco Siligoni, Vittuone, all of Italy, assignors to Cselt - Centro Studi e Laboratori Telecomunicazioni S.p.A., Turin, Italy

Filed May 11, 1984, Ser. No. 609,189
Claims priority, application Italy, May 12, 1983, 67531 A/83
Int. Cl.[4] H03K 3/36; H04B 1/38; H04L 5/14; H04J 15/00
U.S. Cl. 307—297 4 Claims

1. An integrated circuit comprising:

a unitary semiconductor body;

a plurality of substantially identical circuit elements integrated in said body and connected to be energized with biasing voltages, fixed currents and programmable currents;

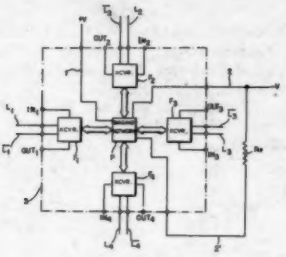
a reference-voltage generator integrated in said body for generating a stabilized reference voltage;

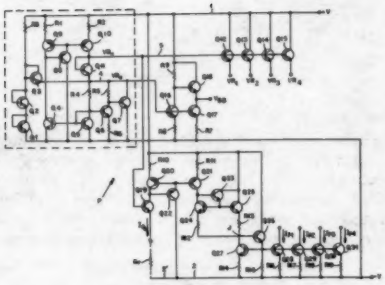
first transistors integrated in said body and connected to said reference-voltage generator and controlled by said stabilized reference voltage for delivering respective biasing voltages of identical magnitudes to control inputs of all of said circuit elements, said first transistors effectively maintaining said control inputs decoupled from one another in spite of the application to said control inputs of identical bias voltages;

second transistors integrated in said body and connected to said reference-voltage generator and controlled by said stabilized reference voltage for producing a small current; and

a two-stage amplifier comprised of third transistors integrated in said body and connected to said second transistors and receiving said small current and amplifying same, said third transistors including respective output transistors programmable by respective resistors in circuit there-

with and applying respective programmable currents to drive inputs of said circuit elements, said output transistors effectively maintaining said drive inputs decoupled from





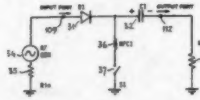
one another in spite of the application to said drive inputs of said programmable currents derived from a common first stage of said amplifier.

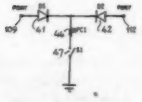
4,673,831

RF POWER SWITCHES

Gyora Reppen, Raanana, Israel, assignor to Tadiran Israel Electronics Industries Ltd., Givat Shmuel, Israel

Filed Dec. 30, 1983, Ser. No. 567,386
Claims priority, application Israel, May 11, 1983, 68659
Int. Cl.[4] H01P *1/10;* H03H *7/48;* H03K *3/33*
U.S. Cl. 307—300 **11 Claims**





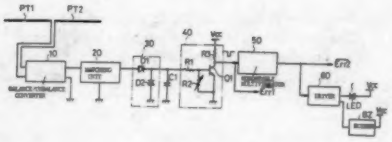
1. An RF switch for high power radio frequency signals having negative and positive voltages swings consisting of a rectifier means in series with a capacitor, or two rectifiers in a back-to-back arrangement, coupled between an input and an output, each said rectifier having predetermined reverse characteristics, so that the reverse characteristics of the rectifier comprises a storage time t_s which is of a duration during which a reverse current, caused by the negative voltage swing of the radio frequency signal, flows through the rectifier, a prolonged duration of t_s resulting in an improved performance of a switch ON characteristic, said input receiving said radio frequency signals; and a control switch serially connected to an inductive element, one side of said inductive element opposite said control switch connected between said capacitor and rectifier, or between the two rectifiers, and one side of said control switch opposite said inductive element connected to a common ground between signals at the input and output, the changing of said control switch from "OFF" to "ON" switching the RF switch from "OFF" to "ON" whereby no external bias voltage or power source is necessary.

4,673,832

SAFETY DEVICE FOR ELECTRONIC EQUIPMENTS

Yuichi Murakami, and Tomohiro Yamamoto, both of Tokyo, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Mar. 13, 1986, Ser. No. 839,242
Claims priority, application Japan, Mar. 13, 1985, 60-49863
Int. Cl.[4] H01Q *1/38*
U.S. Cl. 307—326 **6 Claims**



1. A safety device for electronic equipment comprising:

a printed circuit board having mounted thereon at least a portion of said electronic equipment;

electric field detecting means including at least one antenna comprising a set of two linear electric conductor patterns, one end of each of said patterns being arranged in relative proximity to each other, and the other end of each of said patterns extending in substantially opposite directions, said patterns being formed on said printed circuit board, each of said patterns having a length less than $\frac{1}{4}$ of the wavelength of an electric signal having a frequency which is the highest of a range of possible frequencies of an alternating-current electric field to be detected and delivering an alternating-current corresponding to the alternating-current electric field applied thereto;

signal level comparison means including at least one rectification means for converting an alternating-current signal to a direct-current signal, detecting a level of the electric signal output from said electric field detecting means, comparing the detected level with at least one reference level, and delivering the compared result; and

abnormality processing setting means for setting the electronic equipment into a predetermined abnormality processing state, when the output of said signal level decision means is found correspondent to detection of the high-level electric field.

4,673,833

ELECTROMAGNETIC VIBRATORY EXCITER

Arthur L. Dean; Robert E. Kraft, and Kenneth M. Marshall, all of Indiana, Pa., assignors to FMC Corporation, Chicago, Ill.

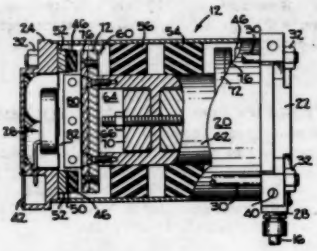
Continuation-in-part of Ser. No. 352,284, Feb. 25, 1982, Pat. No. 4,455,496. This application Mar. 8, 1984, Ser. No. 587,723
Int. Cl.[4] H02K *41/00*
U.S. Cl. 310—29 **6 Claims**

1. An electromagnetic vibratory exciter of the type having a housing capped at opposite longitudinal ends by end caps, the end caps carrying electromagnets inside of the housing, a free mass resiliently supported on the inside of the housing and carrying armature assemblies on opposite longitudinal ends

thereof, the end caps further carrying non-linear elastomeric compression means spaced apart from the opposite ends of the free mass for preventing armature strike against the electromagnets during electromagnetic conduction,

means for mounting the exciter to a driven member having a weight greater than the exciter,

the resiliently supported free mass having a known natural frequency, and



a tuning weight means of predetermined weight positioned inboard of the armature assemblies and mounted to the opposite longitudinal ends of the resiliently supported free mass for tuning the exciter to a frequency ratio between a natural frequency of the driven member, and

an operating frequency of the exciter within a resonance range having an amplification factor of at least five independent of the weight of the driven member.

4,673,834

ENAMELLED WIRE CONNECTION FOR CIRCUIT BOARDS

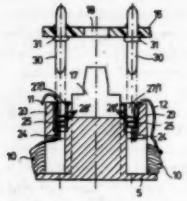
Guenter Wrobel, Villingen, Fed. Rep. of Germany, assignor to Papst-Motoren GmbH & Co. KG, Black Forest, Fed. Rep. of Germany

Filed Feb. 13, 1986, Ser. No. 829,623

Claims priority, application Fed. Rep. of Germany, Feb. 14, 1985, 3505092

Int. Cl.[4] H01R *11/20*

U.S. Cl. 310—71 **9 Claims**



1. An arrangement for providing an electrical connection to the enamelled wires of the coil of an electrical motor, comprising, in combination:

a circuit board carrying at least one conductive component;

a conductive pin-type contact carried by said circuit board and electrically connected to said conductive component;

an insulating body carried by said electrical motor, said insulating body defining at least two receptacle-receiving passageways therein; and

conductive-pin receiving terminals having wall means defining a pin-receiving cavity and engaging means associated with said wall for electrical engagement with one said enamelled wire and one said pin-type contact inserted into said cavity, said engaging means operative to penetrate the enamel covering said wire to establish electrical contact with said wire and said pin.

4,673,835

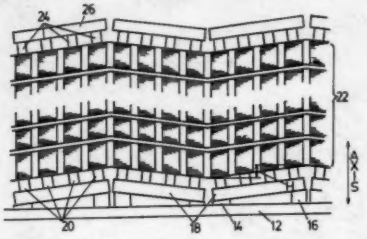
STATOR CORE HAVING WAVED LAMINATIONS

Dean H. Hohnstein; John S. Jandovitz, and Kalman N. Lehoczky, all of Bradenton, Fla., assignors to Siemens Energy and Automation, Inc., Atlanta, Ga.

Filed May 19, 1986, Ser. No. 865,068

Int. Cl.[4] H02K *5/04, 15/14*

U.S. Cl. 310—217 **4 Claims**



1. An electrical machine stator having an axis of rotation comprising a core having a lamination with a wave-shaped surface and a serpentine edge, a base plate oriented perpendicular to the axis and a plurality of press fingers of different heights positioned on the base plate supporting the lamination and maintaining the wave shape of the surface of the lamination.

4,673,836

MOTOR WITH INTEGRAL BRACKET BRUSH HOLDER

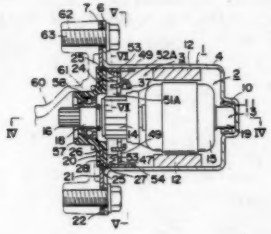
Tsutomu Akiyama, Ohta, and Toshiyuki Kobayashi, Kiryu, all of Japan, assignors to Mitsuba Electric Manufacturing Co., Ltd., Gunma, Japan

Filed Aug. 13, 1985, Ser. No. 765,365

Claims priority, application Japan, Aug. 14, 1984, 59-124482[U]

Int. Cl.[4] H02K *5/16, 15/00;* H01R *39/38*

U.S. Cl. 310—239 **7 Claims**



1. A bracket for a starting motor formed integrally with a brush holder wherein said brush holder is formed of resin and is solidly secured to a bracket of metal and said bracket is jointed to an opening of a yoke, characterized in that:

said bracket is formed into a thin plate shape;

a portion of resin of said brush holder is molded through a hole of said bracket from one surface to the other surface of said bracket, wherein said bracket is inserted into said brush holder preliminary and thereafter molded together with it, whereby said brush holder is integrally formed with said bracket;

a faucet joint portion of said brush holder is formed when said brush holder is formed of resin;

said faucet joint portion is faucet-jointed to an opening of said yoke, whereby said bracket is center-aligned with said yoke;

said bracket is contacted directly with said yoke;

said bracket has a mounting hole matched with a mounting hole of said yoke;

the inner periphery of said bearing member housing portion makes direct metal-to-metal contact with a bearing; and

the outer periphery of said bearing member housing portion is formed to provide a faucet joint portion for mounting to an engine case, whereby the outer periphery of said bearing member housing portion makes direct metal-to-metal contact with said engine case.

4,673,837

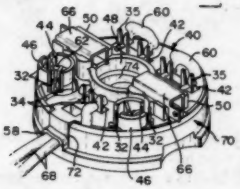
MOTOR BRUSH ASSEMBLY

David J. Gingerich, Swatara; Richard F. Granitz, Harrisburg; William H. Rose, Harrisburg, and David T. Shaffer, Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 609,166, May 11, 1984. This application Nov. 12, 1985, Ser. No. 807,775

Int. Cl.[4] H02K *13/00*

U.S. Cl. 310—239 **12 Claims**



1. A motor brush assembly, comprising:

a stamped and formed lead frame including a large central aperture, plate sections for engagement with respective metal brush holders, pairs of first electrical terminals, and a pair of second electrical terminals each having conductor-connecting means for electrical connection with power wires, one of each pair of said first terminals being electrically connected to a respective said plate section and the other of each pair of said first terminals being electrically connected to a ground contact extending outwardly from said lead frame, said lead frame having first severable sections between the terminals of each said pair of first terminals;

a dielectric housing member secured onto said lead frame with conductor-connecting means of said first and second terminals extending outwardly from said housing member for electrical connection to respective said leads, said housing member having a circular wall around said large central aperture of said lead frame defining a central opening, and said housing member having first openings exposing said first severable sections;

said metal brush holders disposed in brush holder channels on said housing member and having integral lug sections secured to respective said plate sections in electrical engagement therewith, and including brush-receiving sections in communication with said central opening; and

capacitors having leads electrically connected to conductor-connecting means of respective said pairs of first electrical terminals to provide noise suppression, said ground contact extending outwardly from said housing member, and said first severable sections being severed thereby separating said lead frame into separate electrical sections.

4,673,838

BRUSH HOLDING DEVICE FOR ROTATING ELECTRICAL MACHINES

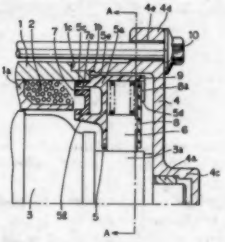
Yoshito Takagi, Toyohashi; Yasuyuki Wakahara; Satoru Hamano, both of Kariya; Masanori Mori; Masayuki Hamaguchi, both of Okazaki, and Naoki Yoshikawa, Nagoya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Oct. 2, 1985, Ser. No. 783,073

Claims priority, application Japan, Oct. 3, 1984, 59-208755

Int. Cl.[4] H02K *13/00*

U.S. Cl. 310—239 **6 Claims**



1. A brush holding device for holding brushes in sliding contact with a commutator of a motor, and disposed between a yoke and an end frame of said motor, comprising:

an annular fixing frame formed as an integral body from an electrically insulating material to have a plurality of flanges radially outwardly extending from an outer periphery thereof and depressions provided at the outer periphery thereof;

a brush holding stay held on said annular fixing frame and formed as an integral body from an electrically insulating material to have a plurality of spaced apart brush holders, each holder having a first opening provided in an inner end thereof to which said commutator faces and a second opening provided in a side surface thereof to which said end frame faces, and connecting portions connecting said brush holders;

an insulating plate disposed between said brush holding stay and an inner wall of said end frame and integrally formed from an electrically insulating material to have a plurality of relatively rigid portions and a plurality of relatively flexible portions bridging said relatively rigid portions therebetween;

said relatively rigid portions being disposed so that they blockade said second openings of said brush holders;

projection means for pushing said relatively flexible portions of said insulating plate toward said brush holding stay, so that said insulating plate is rigidly held on said brush holding stay by resilience of said relatively flexible portions thereof;

a plurality of brushes reciprocally received in said brush holders respectively;

spring means for urging said brushes into sliding contact with said commutator; and

pig tails electrically connected to said brushes

said annular fixing frame having a plurality of flanges radially, outwardly extending from the outer periphery thereof by which said annular fixing frame is substantially held at an edge of said yoke and is substantially aligned with said yoke;

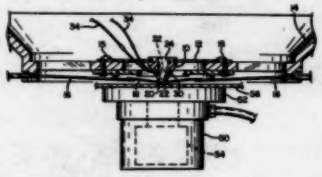
each of said brush holders having walls defining a chamber to receive one of said brushes therein, at least one of said walls further having a depression for passing one of said pig tails therethrough.

4,673,839

PIEZOELECTRIC PRESSURE SENSING APPARATUS FOR INTEGRATED CIRCUIT TESTING STATIONS

Cornelis T. Veenendaal, Cornelius, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Sep. 8, 1986, Ser. No. 905,358
Int. Cl.[4] H01L 41/08
U.S. Cl. 310—338 15 Claims



1. A pressure sensing apparatus for use in an integrated circuit testing station having a test probe secured to a support structure comprising:

a resilient pressure pad secured to said support structure directly above said probe; and

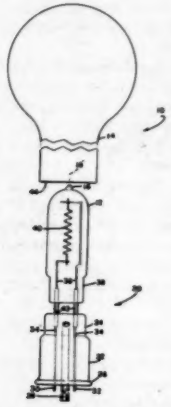
a piezoelectric element embedded within said pressure pad for detecting pressures exerted on said pressure pad during said testing, said piezoelectric element generating electrical impulses proportional to the pressures exerted on said pressure pad during said testing.

4,673,840

RUGGEDIZED MOUNT STRUCTURE FOR TUNGSTEN HALOGEN LAMP

Paul E. Gates, Danvers, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Continuation of Ser. No. 369,714, Apr. 19, 1982, abandoned.
This application Jun. 20, 1984, Ser. No. 623,522
Int. Cl.[4] H01K 1/18
U.S. Cl. 313—25 6 Claims



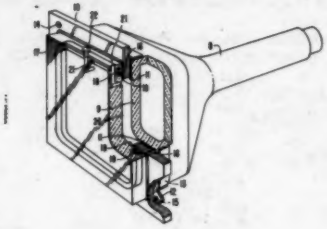
1. A tungsten-halogen incandescent lamp comprising: an inner, light transmitting, hermetically sealed, hard glass capsule of relatively small volume and having a longitudinal axis; and an outer, light transmitting, hermetically sealed, soft glass envelope of relatively large volume and having a longitudinal axis; and a mount structure of soft glass, said mount structure comprising a re-entrant stem having a first press at one end thereof and a sealing are at the opposite end thereof; a pair of lead-in wires comprised of proximal portions a hermetic seal with said first press, distal portions forming a hermetic seal with a second press in said hard glass capsule and extending internally thereof and mounting a tungsten filament, and intermediate portions connecting said proximal and distal portions, said intermediate portions having greater structural rigidity than said proximal and distal portions, said intermediate portions having a diameter from about 3 to about 5 times the diameter of said proximal and distal portions.

4,673,841

LIQUID-COOLED PROJECTION TUBE APPARATUS

Yoshito Miyatake, Hirakata, and Yasuhiko Wagamitsu, Neyagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jan. 15, 1985, Ser. No. 691,704
Claims priority, application Japan, Jan. 18, 1984, 59-6535; Sep. 11, 1984, 59-189910
Int. Cl.[4] H01J 29/86, 5/20
U.S. Cl. 313—35 14 Claims



1. A liquid cooled projection tube apparatus comprising:

a projection tube having a face plate;

a metal plate having a window aperture therein and fixed in liquid tight contact with the face plate of said projection tube with said face plate exposed through said aperture;

a transparent plate formed of resin and fixed in liquid tight contact with said metal plate, said tranparent plate having a groove therein and said metal plate having a projection around said aperture and fitted into and sealed in said groove; and

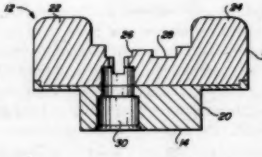
a liquid filling the space defined by said face plate, said aperture and said transparent plate, whereby said transparent plate can be easily positioned with respect to said metal plate and said liquid is sealed within said space.

4,673,842

GRAPHITE CATHODE CUP FOR GRIDDED X-RAY TUBES

Ronald D. Grieger, New Berlin; Sepehr Fariabi, Milwaukee, and Joshua O. Kolawole, Wauwatosa, all of Wis., assignors to General Electric Company, Milwaukee, Wis.

Filed Sep. 3, 1985, Ser. No. 771,696
Int. Cl.[4] H01J 1/48, 35/04, 9/14
U.S. Cl. 313—292 13 Claims



1. In an electronic tube having a relatively high-voltage

developed on a cathode cup for generating and controlling an electron beam, an improved cathode cup comprising:

a base formed of a weldable metal; and

a cup shaped member having an exposed upper surface, said member being formed of an electrically conductive, non-weldable material bonded to said base.

4,673,843

DC DISCHARGE LAMP

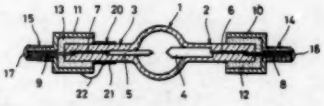
Tsuneo Okanuma, Takasago, Japan, assignor to Ushio Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 19, 1985, Ser. No. 799,583

Claims priority, application Japan, May 16, 1985, 60-102676

Int. Cl.[4] H01J *61/12, 61/35, 61/36*

U.S. Cl. 313—570 **6 Claims**



1. In a dc discharge lamp equipped with a quartz glass envelope, sealed metallic foil anodic and cathodic conductors enclosed respectively within anode-sealing and cathode-sealing portions of the envelope, outer anodic and cathodic leads each connected at one end thereof to the sealed anodic and cathodic conductors respectively and each projecting at the other end thereof out of the envelope, metallic anode and cathode bases fixed on the anode-sealing and cathode-sealing portions respectively, and anode and cathode rods disposed fixedly in the anode-sealing and cathode-sealing portions respectively in such a way that the anode and cathode rods are each electrically connected at one end thereof to the sealed anodic and cathodic conductors respectively and the other end of each of the anode and cathode rods projects into the interior of the envelope, the improvement comprising an electrically-conductive member provided on the outer surface of the cathode-sealing portion and means for electrically connecting the electrically-conductive member and the sealed cathodic conductor, wherein the electrically-conductive member overlies at least a portion of the sealed cathodic conductor adjacent to the cathode rod.

4,673,844

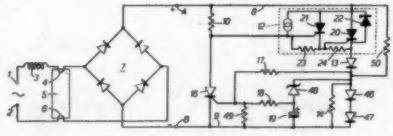
STARTER CIRCUIT FOR A FLUORESCENT TUBE LAMP

Michael J. Maytum, Willington, England, and Anthony Lear, Edinburgh, Scotland, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Sep. 30, 1985, Ser. No. 781,546

Int. Cl.[4] H05B *37/00*

U.S. Cl. 315—200 R **9 Claims**



1. A semiconductor device having a single body of semiconductor material of a first conductivity type with a first region, of a second conductivity type, in one major face of the body, second and third regions, of the second conductivity type, in the other major face of the body, a fourth region, of the first conductivity type, in the surface of the second region, the fourth region having evenly distributed parts of the second region penetrating it so that contact material on the fourth region produces resistive connections in parallel with the p-n junction between the second and fourth regions and a fifth region, of the first conductivity type, in the surface of third region, the fifth region being joined by a conductive link to the second region, wherein the first region, body, and second and fourth regions from a main thyristor, and the first region, body and third and fifth regions form an auxiliary thyristor, in which the controlled path of the auxiliary thyristor is connected from the terminal which it shares with the controlled path of the main thyristor to the gate of the main thyristor via the conductive link, the gate of the auxiliary thyristor being formed by the third region and able to provide controlled paths of both thyristors.

4,673,845

ELECTRONIC FLASH APPARATUS

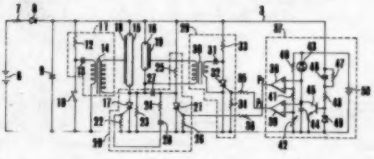
Masanori Yamada, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Japan

Continuation of Ser. No. 517,342, Jul. 26, 1983, abandoned. This application Jul. 8, 1985, Ser. No. 753,794

Claims priority, application Japan, Jul. 29, 1982, 57-130392; Jul. 29, 1982, 57-130393

Int. Cl.[4] H05B *37/00*

U.S. Cl. 315—241 P **14 Claims**



1. An electronic flash apparatus comprising:

(a) capacitor means for accumulating flash energy;

(b) first flash emitting means for emitting an indirect illumination light;

(c) second flash emitting means for emitting a direct illumination light, said second flash emitting means being connected in parallel to said first flash emitting means;

(d) common switching means connected in series to a parallel circuit including said first and second falsh emitting means; and

(e) control means for controlling said second flash emitting means and for varying the condition of said switching means, said control means producing a first signal for causing the second flash emitting means to flash when light reflected by an object and emerging from said first flash emitting means reaches a first level, and producing a second signal to render the common switching means inoperative so as to extinguish the illuminating light of the first and second flash emitting means when light reflected by the object and emerging from said first and second flash emitting means reaches a second level.

4,673,846
MICROWAVE DISCHARGE LIGHT SOURCE APPARATUS

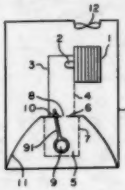
Kenji Yoshizawa, Takrazuka; Hirotsugu Komura, Nagasaki; Hitoshi Kodama, Yokosuka; Kazushi Ohnuki, Hiratsuka; Isao Shoda, Yokohama; Kazuo Magome, Kamakura, and Hiroshi Ito, Yokohama, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 26, 1985, Ser. No. 705,529

Claims priority, application Japan, Mar. 2, 1984, 59-39980; May 7, 1984, 59-90343; May 7, 1984, 59-90345; May 7, 1984, 59-90346; May 7, 1984, 59-66298[U]; May 7, 1984, 59-66299[U]; May 7, 1984, 59-66300[U]; May 8, 1984, 59-91369; Jun. 8, 1984, 59-85101[U]; Aug. 9, 1984, 59-122110[U]; Oct. 19, 1984, 59-219926

Int. Cl.[4] H05B *41/16, 41/24*

U.S. Cl. 315—248 **49 Claims**



1. A microwave discharge light source apparatus comprising a microwave resonance cavity having a wall surface, a substantial part of which is constituted by a light transmitting member, and the remaining part of which is constituted by a light reflecting plate, said light transmitting member being located within the volume defined by the light reflecting plate, said microwave resonance cavity receiving microwaves from a waveguide through a power feeding port, a lamp placed in said microwave resonance cavity at such a position that the three-dimensional angle from a point in said lamp which includes the entire light transmitting member is at least 2π steradian, characterized in that said light transmitting member is formed by a mesh member having a conductive surface and wires crossed each other to form said mesh member are electrically jointed integrally and without any contact resistance at each crossing point.

4,673,847
COLOR MONITOR WITH IMPROVED DIGITAL CONVERGENCE

Chuen W. Louie, Richmond Hill; Darrell D. Roelofs, Huntington Station; John L. Volk, Eatons Neck, all of N.Y., and Arthur L. Romeo, Los Angeles, Calif., assignors to Hazeltine Corporation, Commack, N.Y.

Filed Apr. 12, 1985, Ser. No. 722,960

Int. Cl.[4] H01J *29/70*

U.S. Cl. 315—368 **12 Claims**

1. A color video monitor having a high resolution display, comprising:

means for amplifying an input video signal;

means for producing color convergence signals including red convergence signals, blue convergence signals and green convergence signals;

means connected to receive said color convergence signals for providing vertical deflection signals and convergence driver signals for said color video monitor;

means connected to the vertical deflection means for providing horizontal deflection signals and dynamic focus signals for said color video monitor;

a cathode ray tube; and

means coupled to said cathode ray tube for receiving said color convergence signals, said vertical deflection signals, and said horizontal deflection signals for controlling the display on said cathode ray tube;

said means for producing said color convergence signals including:

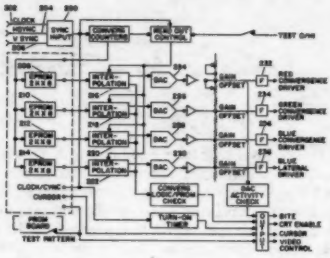
first memory means for storing information for determining preliminary red convergence signals;

second memory means for storing information for determining preliminary green convergence signals;

third memory means for storing information for determining preliminary blue convergence signals;

first interpolating means for interpolating between successive vertical portions of said red convergence signals and for providing digital red convergence signals such that a smooth convergence change between lines is achieved;

second interpolating means for interpolating between successive vertical portions of said green convergence



signals and for providing digital green convergence signals such that a smooth convergence change between lines is achieved;

third interpolating means for interpolating between successive vertical portions of said blue convergence signals and for providing digital blue convergence signals such that a smooth convergence change between lines is achieved; and

wherein said first memory means, said second memory means and said third memory means provided said preliminary convergence signals (*f*) according to a fourth-order polynomial expressions dependent upon X and Y where X is proportional to the horizontal location of the point of correction on the CRT and Y is proportional to the vertical location of the point of correction on the CRT.

4,673,848
CONTROL SYSTEM FOR AN AUTOMATIC DOOR

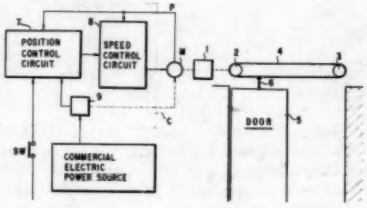
Isao Hagiwara, and Yukio Yoshida, both of Namerikawa, Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan

Filed Dec. 5, 1985, Ser. No. 804,833

Claims priority, application Japan, Dec. 29, 1984, 59-200206

Int. Cl.[4] H02P *1/18*

U.S. Cl. 318—266 **6 Claims**



1. A control system for an automatic door comprising:

a brushless D.C. motor having a stator armature encircling a

rotatably mounted magnetic field rotor defining magnetic poles and coupled to a door member;

speed reduction means for transmitting driving power from said brushless D.C. motor to said door member;

means for delivering magnetic pole position detection pulses from said brushless D.C. motor as said magnetic field rotor rotates;

a position control circuit responsive to said magnetic pole position detection pulses delivered from said delivering means for determining the position of said door member and thereby generating a speed command signal indicating the direction and magnitude of the speed of said door member; and

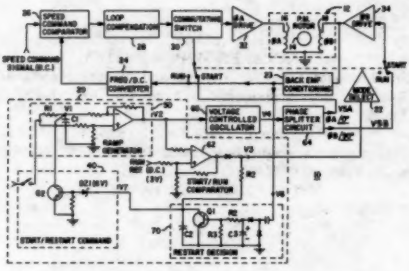
a speed control circuit responsive to said magnetic pole position detection pulses and said speed command signal connected to apply a drive control signal to said brushless D.C. motor so that said brushless D.C. motor is driven at such rotational speed that said door member is moved at the speed indicated by said speed command signal.

4,673,849

PERMANENT MAGNET MOTOR CLOSED LOOP RESTARTING SYSTEM

Jerome Sears, Wyckoff; Walter Parfomak, Wallington, and Walter Kluss, Clifton, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Oct. 10, 1986, Ser. No. 917,586
Int. Cl.[4] H02P 1/18
U.S. Cl. 318—272 **9 Claims**



1. A permanent magnet motor drive system comprising:

a permanent magnet rotor;

a two-phase stator having a first winding and a second winding;

power means providing electrical power for driving the first winding and the second winding in a two-phase drive mode during a start cycle;

means for initiating single phase driving after a selected period of time for driving only the first winding;

test means including means for sampling the back EMF signal induced in the second winding during single phase driving and means for initiating a two-phase drive restart cycle if the sampled back EMF falls below a predetermined value.

5. A method for operating a motor having a permanent magnet rotor and a plurality of stator windings comprising the steps of:

(a) providing drive signals to the plurality of stator windings during a start cycle;

(b) switching to a single phase drive mode, driving one of the stator windings, after a period of time;

(c) sampling the back EMF induced in one of the unenergized stator windings during the single phase drive mode; and

(d) reinitiating step (a) if the sampled back EMF is below a selected reference value.

6. A closed loop drive system (10) for a permanent magnet motor (12) operable in a two phase drive mode during a start cycle and a single phase drive mode during a run cycle, following the start cycle, characterized by:

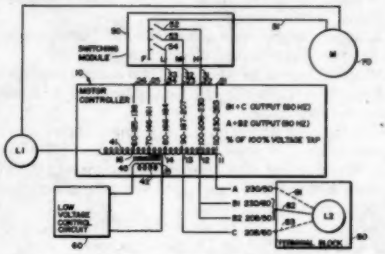
a restart decision circuit (20) which monitors the back EMF induced in an unenergized stator winding (13) during the run cycle and reinitiates the two-phase drive mode if the induced back EMF falls below a selected reference value.

4,673,850

UNIVERSAL MOTOR CONTROL SYSTEM

Wendell E. Maudlin, York, Pa., assignor to York International Corp., York, Pa.

Filed Jul. 14, 1986, Ser. No. 885,309
Int. Cl.[4] H02P 7/64
U.S. Cl. 318—305 **4 Claims**



1. In a system requiring motor control at multiple speed levels and power supply to an isolated low voltage control circuit (60),

an auto-transformer coil (41) having at least first, second and third tapping points (11, 12, 13) formed thereon, said tapping points corresponding to levels of 110 percent, 100 percent and 90 percent of an available power supply line voltage (L2),

first line means (81) extending from said first auto-transformer tapping point (11) for attachment to and receipt of power from a terminal block (80) when a power supply (L2) of 230 V/50 Hz is encountered,

second line means (82) extending from said second auto-transformer tapping point (12) for attachment to and receipt of power from a terminal block (80) when a power supply (L2) of 230 V/60 Hz or 208 V/50 Hz is encountered,

third line means (83) extending from said third auto-transformer tapping point (13) for attachment to and receipt of power from a terminal block (80) when a power supply (L2) of 208 V/60 Hz is encountered,

a motor control unit (10) which contains said auto-transformer coil (41) and at least first, second and third remote tapping points (22, 23, 24) formed as a part of said motor control unit,

a first line means (31) for conveyance of high speed motor voltage from said first remote tapping point (22),

a second line means (32) for conveyance of medium speed motor voltage from said second remote tapping point (23),

a third line means (33) for conveyance of low speed motor voltage from said third remote tapping point (24),

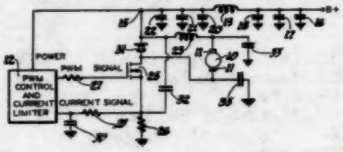
switch means (52, 53, 54) for conveying a desired power level to a line (51) to a motor (70) to be run at differing speeds,

wherein said motor control unit (10) further includes a secondary transformer coil means (42) for supply of low voltage power to a low voltage control circuit (60).

4,673,851
PWM MOTOR OPERATING SYSTEM WITH RFI SUPPRESSION

Robert J. Disser, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 31, 1986, Ser. No. 845,909
Int. Cl.[4] G05B 11/28; H02J 1/02
U.S. Cl. 318—341 2 Claims



1. A pulse width modulated DC motor operating system comprising, in combination:

a DC power supply with power and ground terminals;

a low pass filter including charge storage means;

a DC motor having an armature terminal connected through the low pass filter to the power terminal and another armature terminal;

a FET having a drain connected to the other motor armature terminal, a source and a gate, the FET having a current carrying path between source and drain switchable in response to a signal on its gate between conducting and non-conducting states;

a resistor connected between the FET source and the ground terminal of the DC power supply;

means for generating a PWM signal at a predetermined frequency and duty cycle and applying it to the FET gate to switch the DC motor armature current;

a free-wheeling diode connected across the motor armature terminals with its anode connected to the FET drain, the freewheeling diode being switched between its forward conducting and back-biased states as the FET is switched between its non-conducting and conducting states and tending to become a momentary short circuit across the motor armature terminals as it is so switched; and

a capacitor connected from the source of the FET to the cathode of the diode with minimal lead length to reduce stray inductance, the capacitor being effective to communicate voltage shifts across the resistor with FET switching between its conducting and non-conducting states to the cathode of the diode and thus serve as a source of supplemental current flow through the diode during diode switching partially in preference to the charge storage means of the low pass filter, whereby the diode switching voltage spikes communicated through the low pass filter to the DC power supply are reduced in amplitude and frequency.

4,673,852
DEVICE FOR THE ELECTRIC LOW-VOLTAGE DRIVING OF A ROTATABLE MASS HAVING HIGH INERTIA AND A MOTOR WHICH IS PART OF SAID DEVICE

Jean-Francois Geiger, Colombes, France, assignor to S.A.M.M.-Societe d'Applications des Machines Motrices, Issy Les Moulineaux, France

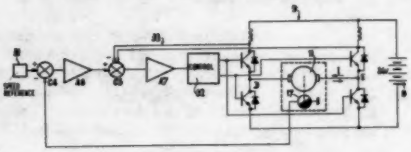
Filed Feb. 5, 1985, Ser. No. 698,501
Claims priority, application France, Feb. 6, 1984, 84 01 777
Int. Cl.[4] H02P 7/30
U.S. Cl. 318—341 14 Claims

1. An electric dc motor for driving a rotatable mass having a high inertia, comprising:

(a) an electric motor having an armature (11) and a field system (13), said field system comprising at least two pole pieces (18) each including one permanent magnet (14) and one excitation coil (16), each magnet providing a first source of magetic energy and each excitation coil providing a second source of magnetic energy,

(b) each excitation coil and its associated magnet being disposed one above the other between a yoke (19) and an axis of the motor such that both the first and second sources of magnetic energy produce a resultant magnetic energy which simultaneously acts on a same portion of the armature,

(c) each excitation coil having an electric conductor wound around an associated pole piece and along surfaces parallel



to an adjacent portion of the yoke to create a magnetic induction in a direction opposed to the direction of the magnetic induction of its associated magnet,

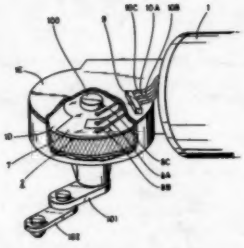
(d) means for producing a unidirectional field current in said excitation coils, and

(e) electrical energy converter means for supplying electrical power to said armature such that an increase in the magnitude of said unidirectional current progressively decreases the torque coefficient of the motor which is maximum when said coils are not supplied with current.

4,673,853
CONCEALED WIPER SYSTEM

Akira Tsunoda; Takahiko Tanaka, and Noboru Handa, all of Shizuoka, Japan, assignors to Asmo Co., Ltd., Kosai City, Japan

Filed Jan. 6, 1986, Ser. No. 816,254
Claims priority, application Japan, Jan. 18, 1985, 60-008050; Jan. 20, 1985, 60-005550[U]
Int. Cl.[4] H02P 3/00; B60S 1/08
U.S. Cl. 318—443 6 Claims



1. A concealed wiper system comprising:

a wiper motor having an output shaft selectively drivable in one of a normal and reverse direction,

a wiper arm movable to a retracted stop position,

a first crank arm and a second crank arm connected between said output shaft and said wiper arm, said second crank arm being connected to said first crank arm and movable relative to said first crank arm to an extended position when said wiper motor output shaft is driven in said reverse direction such that said wiper arm is moved to said retracted stop position,

a wiper activation switch movable between a plurality of switch positions and a two bit selection signal output responsive to said switch positions,

a wiper motor position detector including a plurality of detector contacts connectable to ground at prescribed

rotary positions of said output shaft and a two bit detection signal output responsive to the constructions between said contacts and ground,

a wiper motor drive circuit connected with said wiper motor to activate said drive motor to drive said output shaft selectively in one of said normal and reverse directions,

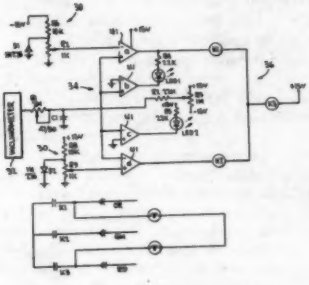
control means to provide control signals to said wiper motor drive circuit, said control means including a microcomputer responsive to said selection signal output and said detection signal output to provide said control signals to said wiper motor drive circuit.

4,673,854

ELECTRONIC CROSS-LEVEL DETECTION SYSTEM

Wesley H. Patton, Atlanta, and Jeffrey L. Thompson, Lawrenceville, both of Ga., assignors to Southern Railway Company, Washington, D.C.

Filed Aug. 1, 1984, Ser. No. 636,718
Int. Cl.[4] B64C *17/06*; E01B *35/02*
U.S. Cl. 318—649 1 Claim



1. An electronic control circuit for generating control signals to maintain a platform level, comprising:

an inclinometer mounted to the platform to sense deviations from the horizontal and generating an output signal representative thereof;

means for filtering said output signal to eliminate EMI and RFI;

means for level-shifting the filtered output signal to compensate for mounting errors of said inclinometer;

means for generating respective positive and negative threshold voltages;

means for respectively comparing the level-shifted voltage with said positive and negative threshold voltages to generate level control signals therefrom and including a first comparator responsive to positive level shifts of said inclinometer output signal exceeding said positive threshold voltage and a second comparator responsive to negative level shifts of said inclinometer output signal exceeding said negative threshold voltage to generate said level control signals; and

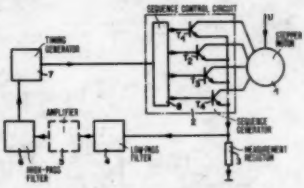
means for indicating the polarity of said positive or negative voltage level shifts and including respective comparator circuits for comparing the respective positive or negative level shifts with a ground reference.

4,673,855

RESTRAINING THE INSTABILITY OF A STEPPER MOTOR

Pierre Boillat, Meyriez, Switzerland, assignor to Sodeco-Saia AG, Murten, Switzerland

Filed Feb. 28, 1985, Ser. No. 706,501
Claims priority, application Switzerland, Nov. 6, 1984, 05323/84
Int. Cl.[4] H02P *8/00*
U.S. Cl. 318—696 4 Claims



1. In an apparatus for preventing instability of a stepper motor operated by a plurality of alternating currents of different respective phases and controlled by a sequence of control pulses, said control pulses defining an angular parameter of the stepper motor,

the improvement comprising

a timing generator for producing a pulse signal,

a combined controllable delay element and pulse generator connected to the output of said timing generator, and operable to pulse time modulate said pulse signal,

a sequence generator connected to the output of said combined controllable delay element and pulse generator, said sequence generator generating said control pulses, said control pulses controlling said stepper motor,

a resistor connected to an output of said sequence generator for providing the sum of said phase currents, and for transforming said sum into a voltage fluctuating about an average value,

a low-pass filter connected to said resistor for receiving said voltage, and for determining said average value with a substantially 90° phase shift, and

a high-pass filter connected to an inut of said combined delay element and pulse generator for providing fluctuations about said average value to said combined delay element and pulse generator for pulse time modulating said pulse signal, said combined delay element and pulse generator including a counter, a high frequency pulse generator connected to an input of said counter, an analog-to-digital converter having an output thereof connected to another input of said counter, and a decoder having an input thereof connected to an output of said counter.

4,673,856

STEPPING MOTOR DRIVE CIRCUIT

Kazuaki Takaishi, Shizuoka, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Nov. 22, 1985, Ser. No. 801,089
Claims priority, application Japan, Nov. 30, 1984, 59-253070
Int. Cl.[4] H02P *8/00*
U.S. Cl. 318—696 16 Claims

1. A stepping motor drive circuit comprising:

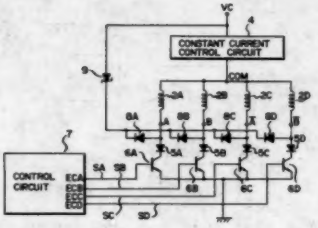
a common terminal, a power source terminal and a reference potential terminal;

a plurality of switching means, respectively connected in series with a plurality of excitation coils between said reference potential terminal and said common terminal for controlling currents flowing through said excitation coils; and

constant current control means, connected between said power source terminal and said common terminal for

setting the currents flowing through said plurality of excitation coils to a substantially constant value,

wherein said constant current control means includes first resistive means; a first transistor having one of its collector and emitter terminals connected to said power source terminal through said first resistive means and the other of its collector and emitter terminals connected to said common terminal; a control circuit means having a control terminal coupled to said one of the collector and emitter terminals of said first transistor for supplying a control signal to a base of said first transistor in response to a voltage drop in said first resistive means and thereby to control the conduction state of said first transistor; and a feedback circuit having a predetermined time constant connected between the control terminal of said control circuit means and the other of the collector and emitter terminals of said first transistor.

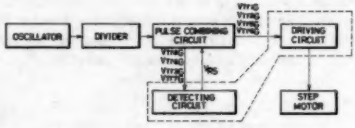


4,673,857

METHOD FOR DRIVING A TURN DETECTOR CIRCUIT WHICH DETECTS THE TURN OF A STEP MOTOR

Yuichi Inoue, Tokyo, Japan, assignor to Seiko Instruments & Electronics Ltd., Tokyo, Japan

Filed Oct. 4, 1985, Ser. No. 784,240
Claims priority, application Japan, Oct. 16, 1984, 54-216581
Int. Cl.[4] H02P 8/00
U.S. Cl. 318—696 9 Claims



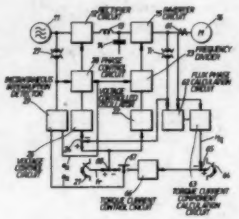
1. In a method for driving a turn detector circuit which detects the turn of a rotor of a step motor having the rotor, a coil and a stator by connecting a high impedance element electrically to said coil by operating a first switching means and connecting a low impedance element electricallly to said coil by operating a second switching means, alternately, the improvement comprising the steps of: applying a first signal to said first switching means for connecting said high impedance element to said coil; applying a second signal to said second switching means for connecting said low impedance element to said coil; and then applying a third signal to said second switching means for disconnecting said low impedance element from said coil while said high impedance element is connected to said coil during the time of detecting the turn of said rotor.

4,673,858

POWER CONVERTER FOR AC LOAD

Suzuo Saito, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 11, 1985, Ser. No. 743,364
Claims priority, application Japan, Jun. 11, 1984, 59-119519; Jun. 11, 1984, 59-119520
Int. Cl.[4] H02P 5/40
U.S. Cl. 318—805 11 Claims



1. A power converter for converting a first AC power from an AC power source to a second AC power for a load comprising:

forward conversion means, connected to the AC power source, for converting said first AC power into a DC power;

filter means, connected to the forward conversion means and including at least a capacitor, for filtering said DC power;

inverter means, connected to the filter means, for converting the DC power into said second AC power and adapted for driving the load;

calculation means, coupled to said second AC power, for calculating a torque current component of the load from a voltage and a current thereof;

detection means for detecing an occurrence of an instantaneous interruption in the AC power source and producing an output signal indicative thereof;

command means, coupled to said inverter means, for commanding a frequency of said second AC power by producing a command output signal;

control means, coupled to said command means and said inverter means, for controlling said voltage of said load in accordance with said command output signal of said command means and a reference value; and

first compensation means for compensating the command output signal of said command means so that said torque-current component of the load as indicated by the output signal of said calculation means becomes substantially zero in response to said output signal of said detection means.

4,673,859

INDUCTION MOTOR SYNTHESIS CONTROL APPARATUS AND METHOD

David J. Shero, South Park Township, Allegheny County, Pa.; Habib Dadpey, Atlanta, Ga., and C. Scott Magee, Houston, Tex., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 31, 1985, Ser. No. 696,814
Int. Cl.[4] H02P 5/40
U.S. Cl. 318—810 17 Claims

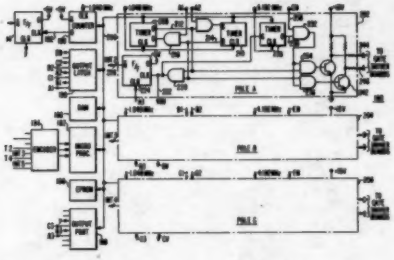
1. In control apparatus for an induction motor responsive to a wide range of input voltages, said motor having at least one phase and operative with an inverter having an upper switch device and a lower switch device for each phase of the motor, said inverter being coupled with a power source having a voltage and said inverter being responsive to an effort request signal, the combination of

first means for predetermining in a running time relation to

each motor phase the successive first conduction times for the associated upper switch device and the successive second conduction times for the associated lower switch device to supply a desired voltage having a desired frequency for energizing each phase of said motor,

second means including for each phase of the motor a first timer responsive to the first conduction times for that phase and providing a first output signal to control the conduction of the upper switch device of that phase and including a second timer responsive to the second conduction times for that phase and providing a second output signal to control the conduction of the lower switch device of that phase, with said first timer being responsive to each second output signal of that phase and said second timer being responsive to each first output signal of the phase, and

third means providing a clock pulse at the same rate to each of the first and second timers for synchronizing the operation of said first and second timers, without interrupting the running time of said first means.

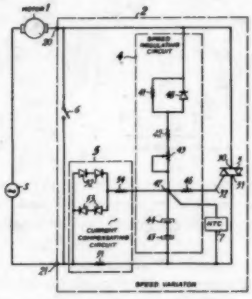


4,673,860

SPEED CONTROL CIRCUIT FOR AC MOTOR

Robert Machuron, St. Vallier, France, assignor to Ronic S.A., Nice, France

Filed Jan. 21, 1986, Ser. No. 820,072
Claims priority, application France, Jan. 21, 1985, 85 00805
Int. Cl.[4] H02P 5/40
U.S. Cl. 318—812 **12 Claims**



1. Apparatus connected in series with an AC motor and an AC voltage supply for variably controlling the speed of the motor, comprising

(a) a controllable switching device having a control electrode;

(b) means connected with said switching device for regulating the motor speed at a predetermined value, said speed regulating means including adjustable resistance means and capacitance means connected in series with said switching device, said adjustable resistance means and said capacitance means having a common terminal connected with said control electrode; and

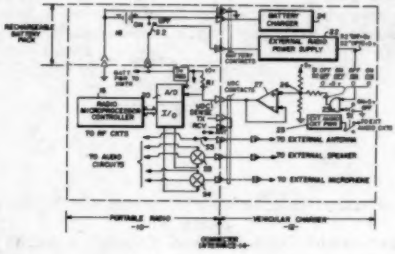
(c) current compensation means connected between said capacitance means and the AC voltage supply for compensating a current increase when the load torque on the motor increases, said compensation means including at least two oppositely-poled diodes connected in series with a first resistor between said common terminal and the supply and a second resistor connected between the supply and the junction between said switching device and said capacitance means, whereby the motor speed is maintained at the predetermined value.

4,673,861

BATTERY CHARGER/REMOTE CONTROL FOR PORTABLE RADIO DEVICES

George Dubovsky, Forest, and Terry N. Garner, Lynchburg, both of Va., assignors to General Electric Company, Lynchburg, Va.

Filed Apr. 3, 1986, Ser. No. 847,685
Int. Cl.[4] H02J 7/00
U.S. Cl. 320—2 **5 Claims**



1. A vehicular battery charger for a battery powered portable radio, said charger comprising:

battery charging means for providing battery charging current to the radio;

an auxiliary operating power supply for independently providing operating electrical power to the radio during the battery charging operation; and

control means connectable with said radio and capable of selectively providing at least two different electrical impedance values or voltages to said radio so as to enable the radio to sense the value of such connected impedance or voltage and to control its radio functions in a predetermined manner depending upon which impedance or voltage value is selected.

4,673,862

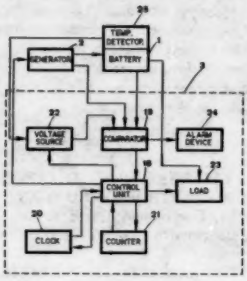
METHOD OF RECHARGING A RECHARGEABLE BATTERY

Tommy Wahlström, P1 4571, 434 00 Kungsbacka, Sweden

PCT No. PCT/SE83/00427, § 371 Date Jul. 19, 1984, § 102(e) Date Jul. 19, 1984, PCT Pub. No. WO84/02431, PCT Pub. Date Jun. 21, 1984
PCT Filed Dec. 6, 1983, Ser. No. 637,230
Claims priority, application Sweden, Dec. 6, 1982, 8206946; Jul. 1, 1983, 8303775
Int. Cl.[4] H02J 7/14
U.S. Cl. 320—64 **9 Claims**

1. Method for recharging during operation of a chargeable battery (1) connected to an electrical system of a motor vehicle, a working machine, a motor boat or similar, whereby an output voltage from a generator (2) connected to the battery (1), by way of a charging circuit, is used as a charging voltage the amplitude of which can be varied by means of controlling

the field of the generator (2), characterized in that, the recharging is performed by means of at least one charging cycle during which charging is performed at a voltage level suitable for recharging the battery which is controlled by the output voltage of the generator (2), each charging cycle consists of a charging period and a test period, and during the test period the battery (1) is loaded and the charging circuit from the generator (2) to the battery (1) is disconnected.



4,673,863

THERMOELECTRIC GENERATOR FOR ENGINE EXHAUST

Alan Swarbrick, No. 3 Residence, "Colanda" , Colac, Victoria 3250, Australia

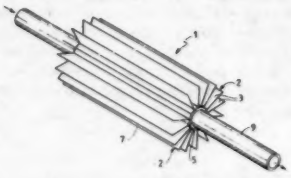
PCT No. PCT/AU85/00111, § 371 Date Jan. 23, 1986, § 102(e) Date Jan. 23, 1986, PCT Pub. No. WO85/05406, PCT Pub. Date Dec. 5, 1985

PCT Filed May 22, 1985, Ser. No. 829,657

Claims priority, application Australia, May 24, 1984, PG5159

Int. Cl.[4] F01N *5/02*; H01L *35/30*

U.S. Cl. 322—2 R **2 Claims**



1. A voltage generator comprising a bank of elongate fins arranged with their longitudinal axes substantially parallel, each fin having a first longitudinal edge in direct heat transfer relation with a source of waste heat emitted from an engine such that a relatively high temperature zone exists at the first longitudinal edge portion, and a second longitudinal edge opposed to the first edge and remote from the heat source, the said second edges being unenclosed free edges, the bank of fins being located within an air flow such that cooling air can pass freely along the fins so that the fins are cooled and a relatively low temperature zone exists at the second edge portion of each fin, and a multiplicity of thermocouples mounted on each fin, each thermocouple having one junction in the high temperature zone of the fin, and a second junction in the low temperature zone of the fin.

4,673,864

CIRCUIT COMPRISING SERIES-CONNECTED SEMICONDUCTOR ELEMENTS

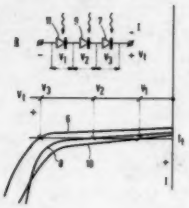
Petrus A. Dessens, and Reiner F. Rumphorst, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 7, 1985, Ser. No. 785,622

Claims priority, application Netherlands, Oct. 16, 1984, 8403148

Int. Cl.[4] H03K *17/18*

U.S. Cl. 323—221 **16 Claims**



1. A variable resistor circuit comprising a plurality of series-connected photosensitive controlled avalanche semiconductor elements each of which is provided with a region with a controlled avalanche characteristic, and means for supplying a controllable quantity of light to each of the semiconductor elements so that the circuit operates as a variable resistor whose overall resistance is a function of the quantity of light to be supplied to the semiconductor elements.

4,673,865

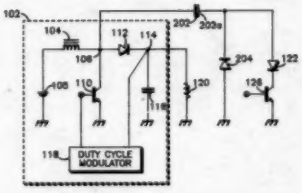
CHARGE COUPLED LED DRIVER CIRCUIT

Michael J. DeLuca, Boca Raton, and James G. Mittel, Hypoluxo, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 4, 1986, Ser. No. 848,056

Int. Cl.[4] G05F *1/46*

U.S. Cl. 323—222 **4 Claims**



1. A light emitting diode (LED) and battery powered driver circuit for use with a battery having a normal operating voltage range, said circuit comprising in combination:

an LED;

a power supply, suitable for connection to said battery, for producing a substantially periodic waveform, wherein the voltage amplitude of said periodic waveform remains substantially constant over said normal operating voltage range of the battery;

a capacitor coupled between said power supply and said LED; and

discharge means, coupled to said capacitor, for discharging said capacitor during a portion of each period of said periodic waveform;

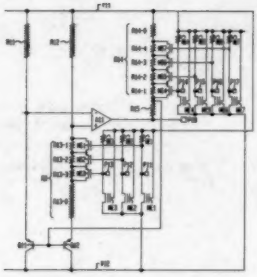
whereby the intensity of light emitted from said LED remains substantially constant over said normal operating voltage range of the battery.

4,673,866

CONSTANT VOLTAGE GENERATOR USING MEMORY TRANSISTORS

Shinji Masuda, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Oct. 26, 1984, Ser. No. 665,447
Claims priority, application Japan, Oct. 27, 1983, 58-201371
Int. Cl.⁴ G05F 3/20
U.S. Cl. 323—313 **9 Claims**



1. A reference voltage generator comprising
first and second voltage terminals;
a differential amplifier having first and second input terminals and an output terminal from which a reference voltage is output;
a first resistor connected between said first voltage terminal and said first input terminal of said differential amplifier;
a second resistor connected between said first voltage terminal and said second input terminal of said differential amplifier;
a first transistor having a collector-emitter current path connected between said second voltage terminal and said first input terminal of said differential amplifier;
a first node;
a third resistor connected between said second input terminal of said differential amplifier and said first node;
a second transistor having a collector-emitter current path connected between said second voltage terminal and said first node;
a second node connected with the base of said first transistor and with the base of said second transistor;
a fourth resistor connected between said second node and said output terminal of said differential amplifier;
a series connection circuit coupled between said first voltage terminal and said second node and including a plurality of series-connected resistors; and
means for programmably providing a by-pass current path for at least one of said series-connected resistors such that a currents flows through said series connection circuit via said by-pass current path and the remaining series-connected resistors which are not provided with said by-pass current path thereby to control an effective resistance value of said series connection circuit.

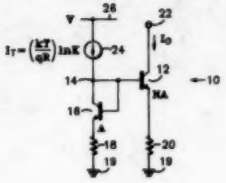
4,673,867

CURRENT MIRROR CIRCUIT AND METHOD FOR PROVIDING ZERO TEMPERATURE COEFFICIENT TRIMMABLE CURRENT RATIOS

William F. Davis, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 30, 1986, Ser. No. 879,879
Int. Cl.⁴ G05F 3/26
U.S. Cl. 323—315 **13 Claims**

1. Circuit for providing an output current that is proportional to an applied input current and having first and second current paths, comprising:
current supply means for supplying a thermal current to the first current path, said thermal current having the form of (kT/qR)ln K, where k is Boltzmann's constant, q is the charge of an electron, R is a resistance of a given resistivity and temperature coefficient, T is absolute temperature and K is a constant;
diode means coupled in the first current path through which substantially all of said thermal current flows;
a first transistor the base-emitter junction of which is coupled in a parallel conduction path with respect to said diode means and the collector-emitter junction being coupled in the second current pathsuch that the output current flows therethrough; and
trimmable resistive means having substantially the same temperature coefficient as said resistance R for adjusting the ratio of the thermal current to said output current with said adjusted ratio being both constant and temperature independent.



9. A method for adjusting the ratio of the output current to the input reference current of a current mirror circuit while maintaining the adjusted ratio substantially temperature independent, the current mirror circuit including a transistor for providing the output current at a first electrode thereof, a diode coupled in a parallel conduction path to the control-second electrode conduction path of the transistor and receiving the input reference current, and trimmable resistive means for adjusting the ratio of the reference current to the output current, comprising the steps of:
providing an input reference current having a magnitude that varies directly with absolute temperature multiplied by a constant factor and inversely to the resistance of a resistor of a given resistivity and temperature coefficient; and
adjusting the resistance of the trimmable resistive means, said resistive means having the same temperature coefficient as said resistor.

4,673,868

METHOD OF TESTING ELECTRONIC AUTOMOTIVE PARTS

Rolin Jones, Jr., 4103 Pardee St., Houston, Tex. 77026

Continuation of Ser. No. 671,623, Nov. 15, 1984, abandoned. This application Jul. 11, 1986, Ser. No. 885,373
Int. Cl.⁴ G01R 31/02
U.S. Cl. 324—51 **7 Claims**

1. A method for testing a voltage regulator **13** including a pair of ground posts **14**, a first connector post **15**, and a second connector post **16**, which comprises the steps of:
(a) providing
(1) a source of direct electrical current, including positive and negative terminals;
(2) a buzzer which serves as a current detector;
(3) first and second contact probes **6** and **7**, respectively, for making electrical contact with the voltage regulator to be tested; and
(4) means for connecting the source of current, the current detector, and the first and second probes;

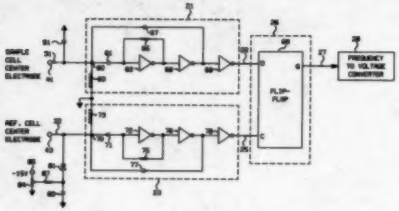
(b) connecting the positive terminal of the currenet source to the buzzer;
(c) connecting the buzzer to the first probe;
(d) connecting the negative terminal of the current detector to the second probe;
(e) contacting the first connector post with the first probe, and one of the ground posts with the second probe;
(f) contacting the second connector post with the first probe, and one of the ground posts with the second probe; and
(g) rating the voltage regulator as in satisfactory condition if, and only if, a low buzzing sound was heard in step (e) and a loud buzzing sound in step (f).

4,673,869

DIELECTRIC CONSTANT DETECTOR CAPACITANCE MATCHING

Richard W. Michael, Pasadena, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 13, 1985, Ser. No. 701,338
Int. Cl.[4] G01R *27/26*
U.S. Cl. 324—61 R **20 Claims**



11. A method for substantially matching the capacitance of a reference cell and sample cell contained in a dielectric constant detector when the same fluid is present in said reference cell and said sample cell comprising the step of varying the magnitude of the voltage supplied to the anode of a varactor diode, wherein said reference cell has first and second plates which form a first capacitor and wherein said sample cell has first and second plates which form a second capacitor, wherein the cathode of said varactor diode is electrically connected to said first plate of one of said first capacitor and said second capacitor, and wherein the anode of said varactor diode is electrically connected to ground for RF frequencies through a third capacitor having a capacitance substantially larger than the capacitance which can be provided by said varactor diode.

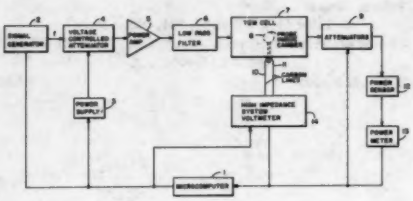
4,673,870

AUTOMATED CALIBRATION TECHNIQUE FOR NON-FIELD PERTURBING (ELECTRICALLY SMALL) ELECTROMAGNETIC FIELD SENSORS

Brian R. Strickland, and George R. Edlin, both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 7, 1985, Ser. No. 763,362
Int. Cl.[4] G01R *35/00, 21/00*
U.S. Cl. 324—74 **7 Claims**

1. A method for calibrating a electromagnetic field probe comprising the steps of:
a. placing the probe inside a controlled environment;
b. creating a field within this environment;
c. maintaining all variations affecting the controlled environment substantially constant except for three functional variations which are frequencies of the field, intensity of the field, and voltage present on the probe;
d. maintaining one of the functional variations at a set first value;
e. adjusting a second of the functional variations in incremental steps;
f. storing the values of the functional variations for each incremental step of the second functional variation in arrays;
g. changing the value of the first functional variation in a



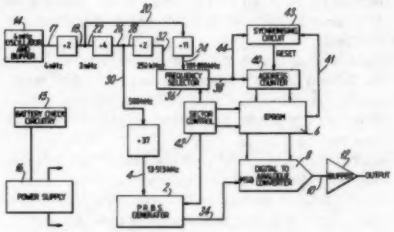
step fashion and repeating steps e and f for each incremental step of the first functional variation; and
h. utilizing the information stored in the arrays to generate coefficients of an equation for the calibration of the probe.

4,673,871

DIGITAL NOISE GENERATOR

John D. Brown; Peter Gladdish, both of Derby, and Michael A. McCormick, Nottingham, all of England, assignors to Rolls-Royce Limited, London, England

Filed Dec. 23, 1985, Ser. No. 812,630
Claims priority, application United Kingdom, Jul. 27, 1985, 8519006
Int. Cl.[4] G01R *19/00*
U.S. Cl. 324—76 R **5 Claims**



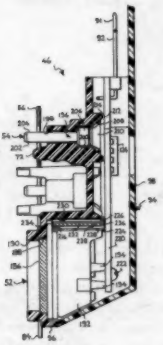
1. A digital noise generator for synthesising a noise spectrum representative of the noise spectrum of a gas turbine aeroengine, the digital noise generator including:
an oscillator having a high pulse frequency output;
a pseudo-random binary sequence generator driven by a low frequency clock signal derived from the output of the oscillator thereby to produce a pseudo-random digital noise signal with a spectrum having a broadband pink noise component in the audio range;
a read-only memory having at least one memory block therein containing simulated tone data in memory address sequence order;
means for addressing the at least one memory block whereby the simulated tone data is outputted from the read-only memory in memory address sequence order thereby to produce a tone signal in digital form; and
means for selectively summing the pseudo-random digital noise signal and the tone signal thereby to produce the noise spectrum signal.

4,673,872

PACKAGING FOR ELECTRONIC DEMAND REGISTER

Warren R. Germer, and Peter F. Losapio, both of Dover, N.H., assignors to General Electric Company, Somersworth, N.H.

Filed Oct. 11, 1984, Ser. No. 659,687
Int. Cl.[4] G01R *11/04*
U.S. Cl. 324—103 R 7 Claims



1. A modular demand register for an electric meter comprising:

a non-conductive housing;

said housing including at least one recess for receiving a display;

a display in said at least one recess;

a circuit board in said housing containing a substantial part of an electronic circuit of said demand register;

means for affixing said circuit board in said housing generally parallel to, and displaced from, said display;

means for interconnecting said circuit board and said display for operation of said display;

a non-conducting back cover for said housing, said housing and said back cover being effective for enclosing all conductive parts of said demand register which may receive power when said demand register is in an operational position within an electric meter;

means for snapping said back cover in place on said housing whereby assembly of said demand register is simplified;

a plurality of parallel pins rigidly affixed to one of said demand register and said electric meter and positioned for plugging into a connector rigidly affixed to the other of said demand register and said electric meter during insertion of said demand register into said electric meter;

said plurality of parallel pins including at least a first pin having a first length and at least a second pin having a second length;

said first length being substantially less than said second length whereby said at least a first pin is electrically connected to said connector after said at least a second pin is connected during insertion of said demand register into said electric meter and said at least a first pin is disconnected from said connector before said at least a second pin is disconnected from said connector during removal of said demand register from said electric meter; and

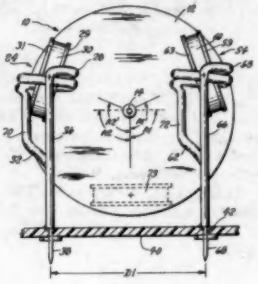
said at least a first pin being connected to provide power to at least a first circuit in said demand register and said at least a second pin being connected to provide signals other than power to at least a second circuit in said demand register whereby connection and disconnection of said signals other than power are always performed before connection and disconnection of power respectively.

4,673,873

IDENTICAL LEFT-RIGHT CURRENT STATORS FOR POLYPHASE WATTHOUR METER

Donald F. Bullock, Somersworth, and Austin F. Wilson, Rochester, both of N.H., assignors to General Electric Company, Somersworth, N.H.

Filed Mar. 14, 1985, Ser. No. 711,716
Int. Cl.[4] G01R *11/02;* H01F *17/04*
U.S. Cl. 324—137 7 Claims



1. A current stator for a watthour meter comprising:

a magnetic stator core having an opening;

a stator coil wound through said opening;

said magnetic stator core being symmetrical about its center;

a line current conductor and a load current conductor connected to said stator coil;

a line current connector tab at an end of said line current conductor;

a load current connector tab at an end of said load current conductor;

said line current connector tab and said load current connector tab being vertically aligned with each other; and

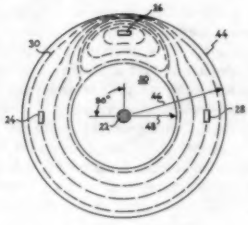
an axis of said line current connector tab and said load current connector tab being aligned with an axis of said stator coil.

4,673,874

ANNULAR ROTOR DISK FOR ELECTRIC METER

Harold L. Stucker, Somersworth, N.H., assignor to General Electric Company, Somersworth, N.H.

Filed Mar. 14, 1985, Ser. No. 711,643
Int. Cl.[4] G01R *11/02*
U.S. Cl. 324—137 12 Claims



1. A rotary disk assembly for an electric meter wherein said rotary disk assembly is subjected to a torque produced by at least first and second eddy currents in reaction to flux from at least first and second sets of opposed potential stators and current stators spaced a predetermined angular distance apart, comprising:

a conductive annulus having an inner radius and an outer radius;

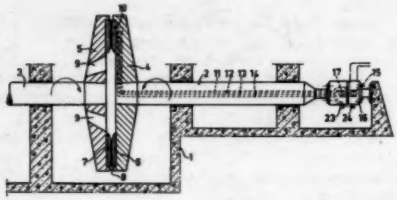
an insulating disk filling said inner radius;
a shaft centered in said insulating disk;
said outer radius having a ratio to said inner radius effective to distort a direction of said first eddy currents in a vicinity of said second set of opposed potential and current stators to a predominantly tangential direction whereby a minimum interaction between said first eddy currents and flux from said second set of potential and current stators is attained; and
said ratio including a ratio of said outer radius to said inner radius of from about 1.75 to about 3.

4,673,875

APPARATUS INCLUDING CONTACT FREE TRANSFER OF SIGNALS FOR MEASURING THE GAP BETWEEN RELATIVELY ROTATING REFINER DISCS

Olof G. Kjellqvist, Täby; Bengt O. Akerblom, Vällingby, both of Sweden, and Axel H. Sjöboen, Bellevue, Wash., assignors to Sunds Defibrator Aktiebolag, Sweden

Filed Jul. 24, 1985, Ser. No. 758,288
Claims priority, application Sweden, Aug. 15, 1984, 8404100
Int. Cl.[4] G01B 7/14; B02C 7/14; G08C 19/06, 19/36
U.S. Cl. 324—207 **3 Claims**



1. Apparatus for measuring the gap between a pair of relatively rotating refiner discs including opposing faces for refining lignocellulose-containing material between said opposing faces comprising rotating means for rotating at least one of said refiner discs so that said pair of refiner discs rotates with respect to each other on opposite sides of a plane between said opposing faces, transmitter means incorporated into said face of said at least one rotating refiner disc for producing a measurement signal in response to changes in reluctance corresponding to changes in said gap, current supply means for supplying an electric current to said transmitter means, said current supply means including transformer means for contact-free transfer of said current to said transmitter means, stationary receiver means for receiving said measurement signal, and measurement signal transfer means for contact-free transfer of said measurement signals from said transmitter means to said stationary receiver means, wherein said rotating means includes an axle on which said at least one refiner disc rotates, wherein said measurement signal transfer means includes second transmitter means comprising a plurality of lamps mounted on said axle, wherein said transformer means includes a first winding mounted on said axle and a second winding stationarily mounted radially outside of said first winding, and wherein said stationary receiver means comprises a photodiode mounted radially outside of said second transmitter means.

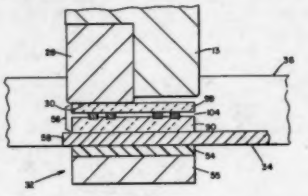
4,673,876

TWO-ELEMENT ANGULAR POSITIVE SENSOR FOR ROTATABLE SHAFT

Dean R. Paulsen, Danvers, Mass., assignor to General Scanning, Inc., Watertown, Mass.

Filed Mar. 9, 1984, Ser. No. 587,709
Int. Cl.[4] G01B 7/30; H01L 43/08
U.S. Cl. 324—208 **11 Claims**

1. An angular position sensor for determining the angular position of a shaft relative to a fixed support to which the shaft is rotatably connnected, comprising
a pair of interactive sensor elements respectively on said shaft and on said support, said elements being arranged for cooperation so that an electrical characteristic of at least one of said elements varies in accordance with the relative rotational positions of said elements, said elements comprising two axially directed surfaces, one on each of said elements, said cooperation being between said two corresponding axially directed surfaces,



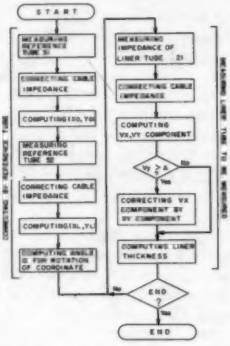
a rigid spacer between and engaged upon said surfaces, and
means for permitting motion of one of said elements along the axis of said shaft, for preventing motion of said one element in directions other than along said axis, and for applying a biasing force tending to automatically and compliantly maintain said elements in contact against the corresponding surfaces of said spacer, in running contact at one respective interface,
whereby the spacing between said axially directed surfaces is kept constant.

4,673,877

ZIRCONIUM LINER THICKNESS MEASURING METHOD AND AN APPARATUS THEREFOR FOR A ZIRCONIUM ALLOY TUBE

Takahide Sakamoto, and Tatsuo Hiroshima, both of Hyogo, Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Filed Sep. 28, 1983, Ser. No. 536,496
Claims priority, application Japan, Sep. 30, 1982, 57-173034
Int. Cl.[4] G01B 7/10
U.S. Cl. 324—225 **12 Claims**



1. An apparatus for measuring a liner thickness of a zirconium liner provided at the inner surface of a zirconium alloy tube, comprising:
a scanning rod adapted to move axially through said tube;
a coil holder mounted at the distal end of said scanning rod;
a coil supported by said coil holder such that an axial end of said coil is positioned adjacent the inner surface of said tube;

a movable support base carrying the near end of said scanning rod for axially moving said scanning rod;

an impedance measuring unit provided at said movable support base for measuring the complex impedance of said coil; and

an arithmetic unit for computing a first component of said complex impedance and a second component of said complex impedance, said first component being a function of the distance between said coil and said inner surface, said second component being substantially perpendicular to said first component and providing an indication of the liner thickness.

4,673,878

VEHICLE LOCATION DISPLAY DEVICE WITH AVERAGING MEANS FOR CORRECTING LOCATION INFORMATION

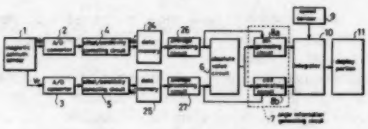
Noburu Tsushima, Morioka; Masashi Fuse, Tamayama; Teruo Mimori; Toshio Sasaki, both of Yokohama, and Tadashi Mukai, Tokyo, all of Japan, assignors to Alps Electric Co., Ltd., Japan

Continuation of Ser. No. 472,059, Mar. 4, 1983, abandoned. This application Jan. 30, 1986, Ser. No. 824,309

Claims priority, application Japan, Mar. 5, 1982, 57-34621

Int. Cl.[4] G01C *17/28;* G01G *7/28;* G01R *33/00*

U.S. Cl. 324—226 **2 Claims**



1. In a current location updating display for a moving member which comprises at least: a magnetic azimuth sensor for detecting local azimuth values of the external magnetic field including terrestrial magnetism at a series of locations traversed by the moving member; a speed sensor for generating sequential pulses indicating incremental distances traversed for the series of locations in accordance with a running speed of said moving member; and a display portion for indicating the series of locations (course locus) traversed by said moving member based on a series of incremental vectors obtained by the incremental distances indicated by said speed sensor and the local azimuth values indicated by said magnetic azimuth sensor, while updating from time to time,

the improvement comprising:

an A/D converter for converting analog output signals from said magnetic azimuth sensor into sequential digital signals representing azimuth data for a series of locations traversed by said moving member;

an offset/sensitivity correcting circuit for imparting a predetermined correction amount to output signals from said A/D converter;

a data memory for storing corrected digital azimuth signals from said offset/sensitivity correcting circuit for said series of locations;

an average processing circuit for averaging the digital azimuth signal for each location with those of a predetermined number of previous locations of said moving member read out from said data memory and providing an averaged azimuth signal for each location;

an absolute value circuit for calculating the absolute value of the averaged azimuth signal from said average processing circuit;

an angle information generating circuit for generating an azimuth vector based on both output signals from said absolute value circuit and said average processing circuit;

an integrator for integrating outputs from said angle information generating circuit in accordance with the output pulses from said speed sensor; and

said display portion thereby indicating a series of incremental vectors comprising the course locus based on said averaged azimuth values for the locations traversed by said moving member in accordance with the content of said integrator, whereby said averaged azimuth values are used to minimize azimuth errors in said incremental vectors of the course locus due to any local magnetic disturbances detected by the magnetic azimuth sensor.

4,673,879

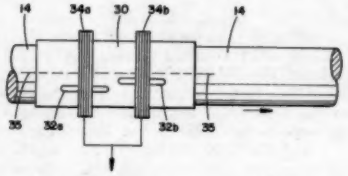
EDDY CURRENT FLAW DETECTOR HAVING ROTATABLE FIELD DEFINING SLEEVE FOR SELECTIVELY ENHANCING INDUCED EDDY CURRENTS IN A WORKPIECE

Richard M. Harris, North Royalton; David A. Valek, Parma; James M. Toth, Lyndhurst, and Richard F. Abramczyk, Brunswick, all of Ohio, assignors to Rupublic Steel Corporation, Cleveland, Ohio

Filed Jun. 27, 1984, Ser. No. 625,029

Int. Cl.[4] G01N *27/90, 27/82;* G01R *33/12*

U.S. Cl. 324—240 **20 Claims**



1. An electromagnetic flaw detection system for detecting defects in metallic workpieces having generally cylindrical outer surfaces, said system comprising:

(a) a drive means for propelling a workpiece along a workpiece travel path;

(b) excitation circuitry mounted in proximity to said workpiece travel path for producing a time varying electromagnetic field along the path for inducing flow of eddy currents in said workpiece;

(c) a generally cylindrical shield defining therein at least two indentations that disrupt a surface of said shield, longitudinally spaced along the length of said shield;

(d) apparatus for rotatably mounting said shield substantially coaxial with said path at a longitudinal position along the path so that said indentations in said shield are rotatable within said varying electromagnetic field;

(e) rotation means for rotating the cylindrical shield to cause the identations to pass through and disrupt the varying electromagnetic field; and

(f) detection circuitry mounted in proximity to said workpiece travel path radially outside said shield for responding to variation in electromagnetic energy induced by eddy current flow in said workpiece to provide an indication of the severity of a workpiece flaw.

4,673,880

PHASE SENSITIVE DETECTION IN MULTISLICE MAGNETIC RESONANCE IMAGING SYSTEMS

Russell A. Compton, Chesterland; John T. Keller, Willoughby, Ohio; Thomas R. McBride, Newberry, and David M. Kramer, Cleveland Heights, all of Ohio, assignors to Technicare Corporation, Cleveland, Ohio

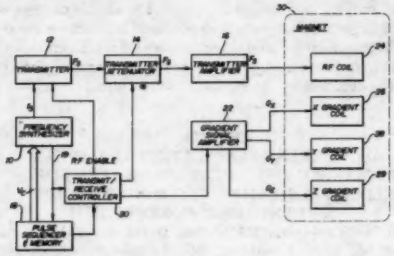
Filed Aug. 16, 1985, Ser. No. 766,617

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 **10 Claims**

1. A magnetic resonance imaging system, including a static

magnetic field; a plurality of field gradients which have a common spatially located field null point, and in which an imaging area which does not include said field null point is excited by a radio frequency transmitter utilizing a given reference signal and NMR signals from said area are received by a receiver utilizing said given reference signal, said receiver further including means for shifting the frequencies of received NMR signals as a function of the frequency of said given reference signal.



4,673,881

MAGNETIC APPARATUS OF A NUCLEAR SPIN TOMOGRAPHY SYSTEM WITH AN APPROXIMATELY HOLLOW-CYLINDRICAL SHIELDING DEVICE

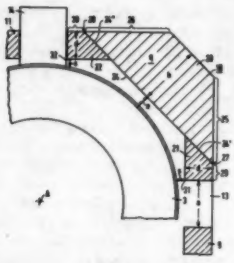
Günther Ries, Eriangen, and Karl-Georg Heinzelmann, Neunkirchen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Nov. 6, 1985, Ser. No. 795,430

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1984, 3441834

Int. Cl.[4] G01R *33/20*; **H01F** *7/00*

U.S. Cl. 324—318 **4 Claims**



1. Magnetic apparatus of a system for nuclear spin tomography having a plurality of magnet coils which surround an interior space suitable for receiving a body to be examined and which generate therein an at least largely homogeneous magnetic field, and having an approximately hollow-cylindrical shielding device of ferromagnetic material which surrounds the magnet coils, the shielding device having at each of its end faces a disc-shaped plate with a central opening having a predetermined radius relative to the cylinder axis, and further comprising four beam-like shielding elements of substantially identical design arranged regularly distributed in the circumferential direction on a common cylinder surface extending between said end face plates, the cross sectional areas of said shielding elements being of triangular or trapezoidal shape, each of said shielding elements having a base surface facing the magnet coils and two adjoining outer side surfaces which are aligned at right angles to each other, each shielding element being extended in outer regions of the base surface with leg parts extending toward the adjoining shielding elements and spaced therefrom, said leg part forming with an adjoining side surface of the shielding element, a common extended outer side surface of the shielding elements, said leg parts having a predetermined thickness in the direction of a normal line with respect to said outer side surface.

4,673,882

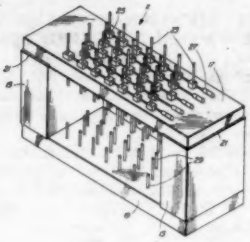
MAGNETIC SYSTEM FOR NUCLEAR MAGNETIC RESONANCE DIAGNOSTIC DEVICE

J. Philip Buford, 513 N. Boston Ave., De Land, Fla. 32724

Filed Mar. 6, 1984, Ser. No. 586,808

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—320 **18 Claims**



1. A magnetic system to achieve a desired magnetic field configuration and strength in an air gap comprising:

a source of magnetic energy;

a first magnetically permeable member to establish a north magnetic pole on one side of the air gap;

a second magnetically permeable member to establish a south magnetic pole on the other side of the air gap, said source of magnetic energy interconnecting said first and second magnetically permeable members;

a set of a plurality of elongated ferromagnetic bars mounted in one of said pole members to convey magnetic flux to and from that pole member, said ferromagnetic bars extending into the air gap between said magnetically permeable members a distance less than the length of the air gap; and

adjusting means to alter the magnitude of magnetic flux flow between said ferromagnetic bars and the other pole member to vary the magnetic field configuration and strength in the air gap to produce the desired magnetic field strength and configuration.

4,673,883

AUTOMATICALLY SCALED ENGINE DIAGNOSTIC APPARATUS

Michael J. Wheeler, 6107 N. Greeley, Portland, Oreg. 97217, and Curtis W. Hart, 1821 D St., Madras, Oreg. 97741

Filed Sep. 20, 1984, Ser. No. 652,593

Int. Cl.[4] G01L *3/26*

U.S. Cl. 324—384 **17 Claims**

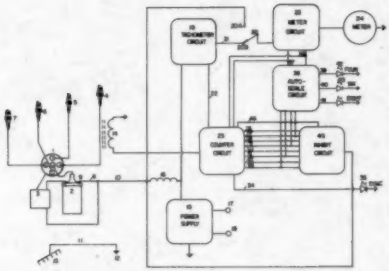
1. A diagnostic apparatus for internal combustion engines of the type having multiple electrical ignitors energized by electrical ignition pulses in response to a periodic ignition primary signals from a source of the ignition primary signal, the apparatus comprising:

engine diagnostic circuit means having an input for receiving ignition primary signals, the engine diagnostic circuit means comprising means for evaluating at least one characteristic of performance of the engine being diagnosed from the ignition primary signals, the engine diagnostic circuit means also comprising means for producing an engine diagnostic output signal corresponding to the performance characteristic;

conversion circuit means having a first input means for

receiving the engine diagnostic output signal, the conversion circuit means comprising means for converting the received engine diagnostic output signal into a visual represntation of the characteristic of performance of the engine being diagnosed;

cylinder number determination circuit means having a first input means coupled to the source of ignition primary signals and second input means coupled to one of the ignitors for detecting the electrical ignition pulses applied to said one ignitor, the cylinder number determination circuit means comprising means for automatically determining the number of cylinders in the engine being diagnosed from the ignition primary signals and detected ignition pulses, the cylinder number determination circuit means also comprising means for producing a scaling output signal corresponding to the number of cylinders in the engine being diagnosed; and



the conversion circuit means having second input means for receiving the scaling output signal and scale adjustment circuit means for adjusting the received engine diagnostic output signal for the number of cylinders in the engine being diagnosed, in response to the scaling output signal, such that the visual representation corresponds to the characteristic of performance of the engine being diagnosed.

4,673,884

CIRCUIT FOR MEASURING THE ANODE CURRENT IN AN X-RAY TUBE

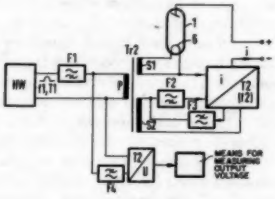
Georg Geus, Wiesbaden, Fed. Rep. of Germany, assignor to Heimann GmbH, Wiesbaden, Fed. Rep. of Germany

Filed Nov. 28, 1984, Ser. No. 675,514

Claims priority, application Fed. Rep. of Germany, Dec. 13, 1983, 3345036

Int. Cl.[4] G01R *31/25*

U.S. Cl. 324—407 **5 Claims**



1. Circuit for measuring anode current in an X-ray tube having an anode and a heater electrode both operable at high voltage, comprising a heater transformer generating current pulses with a time-wise constant first pulse repetition frequency and an adjustable duty cycle, a first frequency separator connected in series with said heater transformer for receiving the output thereof, a high voltage-proof transformer having a primary winding connectd in series with said first frequency separator, and separate first and secondary windings, said first secondary winding being connected to said heater for supplying heater current for the X-ray tube, an anode circuit connected to the anode of the X-ray tube including a current-/duty cycle converter generating a current with a constant second pulse repetition frequency different from said first pulse repetition frequency, said first secondary winding being connected to said current/duty cycle converter for supplying voltage from said high voltage-proof transformer, a second frequency separator connected between said current/duty cycle converter and said second secondary winding of said high voltage-proof transformer for receiving an output signal of said current/duty cycle converter and preventing said first pulse repetition frequency from passing, a duty cycle/voltage converter having an output voltage proportional to the mode current of the X-ray tube, and a third frequency separator connected to said duty cycle/voltage converter together being shunted across said primary winding of said high voltage-proof transformer, said third frequency separator passing said second pulse repetition frequency and preventing said first pulse repetition frequency from passing, and voltage measuring means for measuring said output voltage proportional to the anode current of the X-ray tube.

4,673,885

DEVICES FOR READING THE QUANTITIES OF ELECTRICAL CHARGES BORNE BY A DIELECTRIC

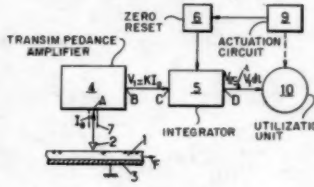
Jacques Lewiner, 5, rue Bory d'Arnex, 92210 Saint Cloud; Georges Charpak, 37, rue de la Plaine, 75020 Paris, and Elie Pollak, 60, rue de Talma, 94400 Vitry sur Seine, all of France

Filed Jul. 12, 1984, Ser. No. 630,117

Claims priority, application France, Jul. 13, 1983, 83 11741

Int. Cl.[4] G01R *29/12*

U.S. Cl. 324—457 **1 Claim**

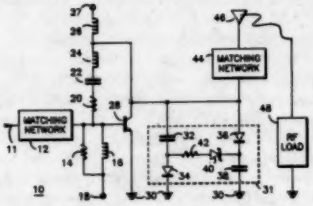


1. Device for reading quantities of electrical changes borne by a dielectric sheet comprising, on opposite side of the sheet, respectively, a first electrodal probe, and a second electrode at a reference potential, means for providing relative movement between the sheet and the probe and electronic means for measuring at each moment the quantities of image charges induced on the probe by the quantities of charges to be read, said electronic measuring means being provided so as to measure the electrical current I_o produced on the probe in response to the induction of the image charges on the probe and comprising: a transimpedance input amplifier for transforming the currents I_o applied to one of the inputs thereof into amplified output voltages $V_1 = K\ I_o$, wherein K denotes a coefficient having the dimensions of an input impedance, and being connected such that the input potential thereto, which is the same as that of the probe, remains substantially constant at a value close to the reference potential; and an analog integrator means for providing integration of the voltage V_1 and including reset to zero means actuated at moments when the probe is positioned opposite a zone of the dielectric sheet at the reference potential.

4,673,886
ADAPTIVELY STABILIZED RF AMPLIFIER

Robert H. Bickley, Scottsdale, and Robin D. Culver, Tempe, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 26, 1986, Ser. No. 833,291
Int. Cl.[4] H03F 1/52
U.S. Cl. 330—298 17 Claims



1. A stabilized RF amplifier having an output transistor with an output node, a matching network, and an antenna, the matching network being coupled between said transistor output node and the antenna, the amplifier comprising:

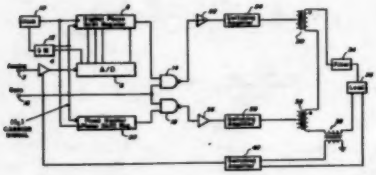
means, coupled between the output node of said output transistor and the matching network, for detecting a predetermined voltage level at the output node of said transistor; and

means, coupled to the output node of said output transistor and to said detecting means, for decreasing impedance presented to the output node of said output transistor, said impedance decreasing means being controlled by said detecting means.

4,673,887
DIGITAL DRIVER FOR FIXED POWER AMPLIFIER

Jay W. Atherton, Seattle, Wash., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 3, 1986, Ser. No. 815,953
Int. Cl.[4] H03F 3/38
U.S. Cl. 330—10 12 Claims



1. A signal control circuit including a digital power amplifier for continuously variable analog signals, said power amplifier comprising:

analog input signal means;

analog-to-digital converter means connected to said analog input signal means to receive continuously variable analog signals therefrom;

said analog-to-digital converter means being operative to produce digital output signals therefrom representative of successive incremental values of said analog signals;

a digital pulse width modulating means including controllable phase displacement means for producing a succession of pulse width modulated output signals;

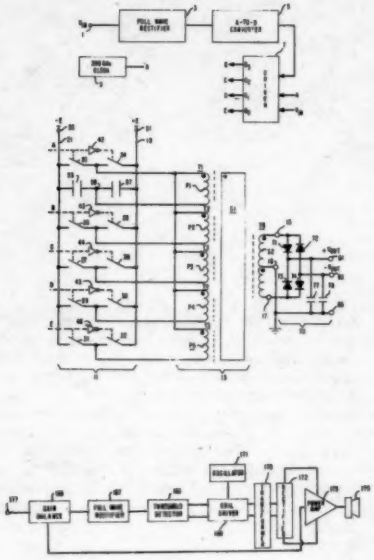
connecting means coupling said analog-to-digital converter means to said modulating means to control said phase displacement means of said modulating means in accordance with said digital output signals from said converter means; and

switching power amplifier means coupled to said modulating means to amplify said pulse width modulated output signals.

4,673,888
POWER CONTROL SYSTEM

Rudolph H. Engelmann, Ann Arbor, and Thad Early, Niles, both of Mich., assignors to Electro-Voice, Inc., Buchanan, Mich.

Filed Sep. 2, 1986, Ser. No. 903,288
Int. Cl.[4] H03F 3/38
U.S. Cl. 330—10 17 Claims



15. A power supply for an audio amplifier, for supplying a voltage varying in accordance with an audio signal being amplified by said audio amplifier, comprising:

first rectifier means for rectifying said audio signal;

means for producing a plurality of DC reference voltages of successively lower predetermined DC levels;

a source of direct voltage;

a plurality of comparator means for comparing levels of reference voltages with the level of said rectified audio signals, respectively, each one of said comparator means changing its output signal from a "low" to a "high" level whenever the level of its associated reference voltage is exceeded by the level of said rectified audio signal;

a plurality of transformers each having a primary winding, and each sharing a common secondary winding;

switching means for (1) selectively rendering ineffective either one or a combination of said plurality of primary windings, and (2) periodically applying said direct voltage across the remaining ones of said plurality of primary windings for causing pulses of current to flow through these windings in a given direction, thereby causing voltage pulses of desired amplitude, polarity, and duration to be induced into said secondary winding; and

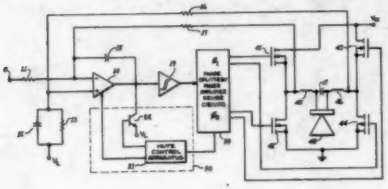
control means for operating said switching means at a predetermined frequency and responsive to the output signals from said plurality of comparator means, respectively, for producing said voltage pulses in said secondary winding at said predetermined frequency and amplitude modulated in correspondence with said command signal.

4,673,889

APPARATUS AND METHOD FOR MUTING AN OUTPUT SIGNAL IN A SWITCHING AMPLIFIER

Carlo Cini, Cornaredo; Claudio Diazzi, and Pietro Erratico, both of Milan, all of Italy, assignors to SGS Microelettronica S.p.A., Agrate, Italy

Filed Dec. 16, 1985, Ser. No. 809,506
Claims priority, application Italy, Mar. 13, 1985, 19868 A/85
Int. Cl.[4] H03F 3/38
U.S. Cl. 330—10 9 Claims



1. In a power switching amplifier in which an integrating circuit, responding to an input audio signal and signals from output power amplifiers, controls a pulse width of output signals activating a speaker system, apparatus for controlling noise signals resulting from transient conditions comprising:

switching apparatus for maintaining said output power amplifiers in a non-conducting state; and

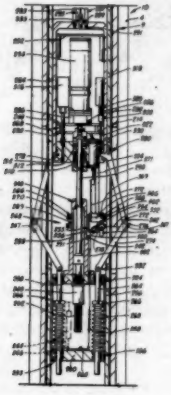
transistor apparatus for controlling a signal at an output terminal of said integrating circuit.

4,673,890

WELL BORE MEASUREMENT TOOL

George V. Copland, and Burchus Q. Barrington, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Jun. 18, 1986, Ser. No. 876,527
Int. Cl.[4] E21B 47/08; G01B 3/34
U.S. Cl. 33—178 F 28 Claims



1. A well bore measurement tool for a well bore having a side wall, comprising:

lower packer means for providing a lower seal in the well bore;

upper packer means for providing an upper seal in the well bore;

caliper means for measuring a deflection of the side wall of the well bore; and

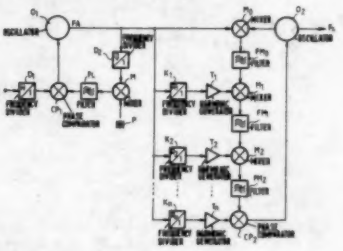
retainer means for retaining said caliper means between said lower and upper packer means so that said caliper means is transportable into the well bore with said lower and upper packer means but so that said lower and upper packer means are longitudinally movable relative to said caliper means when said caliper means engages the side wall of the well bore.

4,673,891

FREQUENCY SYNTHESIZER HAVING FIRST PHASE LOCKED LOOP FREQUENCY MULTIPLIED BY NEAR UNITY IN SECOND PHASE LOCKED LOOP

Joël Remy, Paris, France, assignor to Adret Electronique, Trappes, France

Filed Oct. 15, 1985, Ser. No. 787,191
Int. Cl.[4] H03L 7/18, 7/22
U.S. Cl. 331—2 7 Claims



1. A frequency synthesizer for generating an output frequency variable in a predetermined range by frequency steps having a predetermined value, said synthesizer comprising a first phase locked loop including a first current or voltage controlled oscillator, said first oscillator having a frequency control input and an ouput; a first phase comparator having first and second inputs and an output, the output of the first comparator being connected to the frequency control input of the first oscillator, source means providing an input frequency ($F_o+\Delta$), F_o being a fixed frequency and Δ being a frequency increment variable by predetermined steps which are small with respect to the steps of variation of the output frequency; first divider means connecting said source means to the first input of the first comparator, said first divider means having a first programmable division factor N which is adapted to take a first number of values equalling the number of steps of variation in said output frequency range; second divider means and first mixer means serially connected between the output of the first oscillator and the second input of the first comparator, said second divider means having a second predetermined factor of division Q and a source of standard frequency connected to the first mixer means, said frequency synthesizer further comprising a second phase locked loop including a second current or voltage controlled oscillator having a frequency control input and an output on which the output frequency of the synthesizer is generated, a second phase comparator having first and second inputs and an output, the output of the second phase comparator being connected to the frequency control input of the second oscillator; second mixer means having first and second inputs and an output, the first and second inputs of the second mixer means being respectively connected to the respective outputs of the first and second oscillators, and circuit means connecting the output of the second mixer means to the first input of the second phase comparator and the output of the first oscillator to the second input of the second phase comparator, said circuit means comprising a third frequency divider having a third predetermined division factor R, an input connected to the output of said first oscillator and output means connected to the second input of the second phase comparator, and means connecting the out-

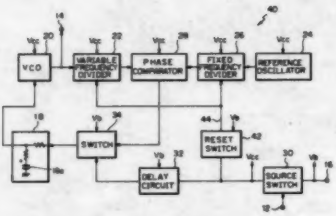
put of the second mixer means to the first input of the second phase comparator, the first and second factors N and Q and the standard frequency having such values that the output frequency F_A of the first oscillator is located within the predetermined range of the output frequency.

4,673,892

PHASE LOCKED LOOP FREQUENCY SYNTHESIZER WITH BATTERY SAVING CIRCUIT

Hideo Miyashita, and Shigeo Yoshihara, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed May 7, 1986, Ser. No. 860,655
Claims priority, application Japan, May 13, 1985, 60-99479
Int. Cl.[4] H03L 7/18
U.S. Cl. 331—14 **3 Claims**



1. A frequency synthesizer which controls an oscillation frequency of a voltage controlled oscillator and is energized by a power source, comprising:

a first frequency divider for dividing an output frequency of the voltage controlled oscillator;

a second frequency divider for dividing an output frequency of a reference oscillator;

a phase comparator for comparing a phase of an output of said first frequency divider and an output of said second frequency divider, a voltage outputted by said phase comparator being fed back to the voltage controlled oscillator via a low-pass filter;

a first switch connected between said phase comparator and said low pass filter; and

a reset circuit interlocked with the power source for producing a reset signal;

said reset signal from said reset circuit resetting said first and second frequency dividers, said first switch being closed after the reset signal has been produced and opened at an instant when the power source has been turned off.

4,673,893

AUDIO OSCILLATOR OUTPUT DEVICE WITH PRESSURE SENSITIVE ADVANCE MECHANISM

David Shorkey, 835 Lakewood Ave., Schenectady, N.Y. 12309

Filed Dec. 9, 1985, Ser. No. 806,387
Int. Cl.[4] G08B 23/00
U.S. Cl. 331—64 **6 Claims**

1. An audible timing device for athletic activities comprising:

an audio oscillator output means for generating an audible sound at a predetermined set of frequencies within a spectrum;

an incremental frequency control for advancing the audio oscillator output through a sequence of discrete frequencies, said frequency control adapted to increase from one frequency to the next through the frequency spectrum when stimulated;

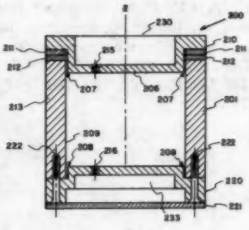
a pressure sensitive depressable signaling mechanism which sends a stimulation signal to the frequency control upon each application of a direct straight pushing force sufficient to depress the mechanism whereby the frequency is advanced through its predetermined sequence.

4,673,894

OSCILLATOR COUPLED THROUGH CYLINDRICAL CAVITY FOR GENERATING LOW NOISE MICROWAVES

Robert G. Rogers, Los Altos, Calif., assignor to California Microwave, Incorporated, Sunnyvale, Calif.

Filed Apr. 10, 1986, Ser. No. 850,162
Int. Cl.[4] H03B 5/18; H01P 7/06
U.S. Cl. 331—96 **13 Claims**



13. A right-circular cylindrical waveguide cavity for resonating with a cylindrical TE_{011} mode when used as the frequency determining element in a low noise microwave oscillator, said cavity comprising:

a right-circular cylindrical metallic housing of length L and diameter D where $(D/L)^2$ is approximately 1.92;

two end plates enclosing said housing, each plate having a continuous circular gap approximately 0.01 D across separating a portion of the interior surface of each plate from said cylindrical housing to restrict microwave signal current flow from the inner surface of said housing to said end plates, said end plates and said housing defining a resonant cavity; and

a single circular post connected to the interior surface of one of said end plates and extending therefrom into said cavity, and disposed at a point on said plate where the TM_{111} mode electric field Z-component into the cavity interior would be at a maximum, said post having a length and diameter, said length being adjusted so that the Q of the cavity is a maximum at the desired resonant frequency and said diameter equal to or less than its length;

said post and said circular gaps for suppressing within the cavity resonating modes of oscillation other than the TE_{011} mode.

4,673,895

OSCILLATOR HAVING IMPROVED COUPLING BETWEEN STRIPLINE AND DIELECTRIC RESONATOR

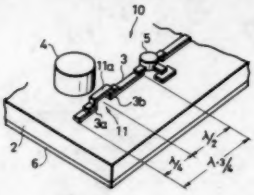
Akio Tadachi, and Akira Takayama, both of Soma, Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Aug. 26, 1986, Ser. No. 900,499

Claims priority, application Japan, Aug. 26, 1985, 60-129635[U]

Int. Cl.[4] H03B 5/18

U.S. Cl. 331—99 1 Claim



1. An oscillator comprising an insulating substrate, a strip structure, a dielectric resonator located adjacent to the strip structure, the last two being mounted on the substrate, and an oscillatory transistor connected to one end of said strip structure, said strip structure consisting of two spaced strip sections and an electrically-conductive bridge-shaped connector section having a conductor part, said conductor part being located further away from said insulating substrate and closer to said dielectric resonator than said two strip sections and being connected between said two strip sections.

4,673,896

MICROWAVE TRANSMITTING AND RECEIVING ARRANGEMENTS

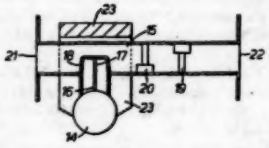
Michael B. C. Brady, Maldon, and Archie W. Crook, Chelmsford, both of England, assignors to English Electric Valve Company, Limited, Chelmsford, England

Filed Dec. 14, 1983, Ser. No. 561,179

Claims priority, application United Kingdom, Dec. 16, 1982, 8235816

Int. Cl.[4] H01P 1/04

U.S. Cl. 333—13 19 Claims



1. A microwave transmitting and receiving arrangement comprising: a channel capable of transmitting microwave energy, having a first port at one end and a second port at another end; a microwave source arranged at a position between the first and second ports to propagate microwave energy into the channel so that at the time of introduction the energy propagates toward both the first and second ports; and means, located between said position and the second port, arranged to provide a short-circuit for and reflect microwave energy propagated theretowards from said microwave source and to pass microwave energy of a relatively lower amplitude incident thereon and received via said first port.

4,673,897

WAVEGUIDE/MICROSTRIP MODE TRANSDUCER

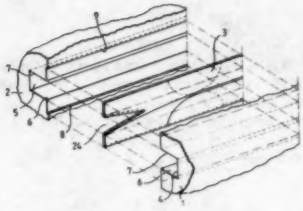
Lye-Whatt Chua, South Nutfield, and Peter J. Gibson, Crawley, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 481,709, Apr. 4, 1983, abandoned. This application Oct. 8, 1985, Ser. No. 787,002

Claims priority, application United Kingdom, Apr. 26, 1982, 8211991

Int. Cl.[4] H01P 5/107

U.S. Cl. 333—26 9 Claims



2. A waveguide/microstrip mode transducer comprising:

(a) a length of waveguide having opposing first and second inner walls defining an E-plane extending perpendicularly thereto;

(b) a flat substrate sheet disposed in the E-plane, said flat substrate sheet extending from a first end to a second end thereof along the length of the waveguide and extending between the opposing first and second inner walls of the waveguide; and

(c) first and second conducive layers disposed on opposite flat sides of the flat substrate sheet, each conductive layer having an inner and an outer boundary defining therebetween the width of said layer;

said mode transducer comprising, from the first to the second ends of the flat substrate sheet, successive sections including:

(1) a coupling section wheere the first and second conductive layers each continuously increase in width with distance from the first end of the flat substrate sheet, the outer boundary of each of said layers extending to and contacting a respective one of the waveguide's first and second inner walls, and the inner boundary of each of said layers, with distance from said first end, gradually approaching a central longitudinal line of said substrate sheet;

(2) an impedance transformer/polarization twister section where the first and second conductive layers each continuously decrease in width with distance from the first end of the flat substrate sheet, the outer boundary of each of said first and second layers being spaced from a respective one of the waveguide's first and second inner walls by a distance which increases with distance from said first end, and the inner boundary of each of said layers, with distance from said first end, continuing to approach the central longitudinal line until said first and second conductive layers overlie one another;

(3) a balanced transmission line section where the first and second conductive layers comprise bands of equal width covering areas in the centers of opposite sides of the flat substrate sheet, thereby forming a balanced transmission line;

(4) a microstrip line section where the first conductive layer continues as a band extending along the center of the flat substrate sheet to the second end of said substrate sheet, and where the second conductive layer gradually increases in width with distance from the first end of the substrate sheet until said width extends from the first to the second inner wall of the waveguide;

said first and second conductive layers being shaped in the

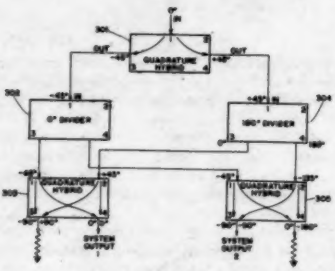
balanced transmission line section, and in at least part of the impedance transformer/polarization twister and microstrip line sections, to define conductor-free areas on opposite sides of the balanced transmission line extending from each of the first and second waveguide walls to the nearest one of said conductive layer boundaries, said conductor-free areas being dimensioned to avoid resonances in the operating frequency range of the waveguide.

4,673,898

WIDE BAND QUADRATURE HYBRID

Kevin P. Redmond, Stuart, Fla., assignor to Advanced Systems Research, Inc., Stuart, Fla.

Filed Feb. 28, 1986, Ser. No. 834,586
Int. Cl.[4] H01P 5/18
U.S. Cl. 333—109 **6 Claims**



1. A system quadrature hybrid comprising:

(a) a first, a second and a third component quadrature hybrid, each component quadrature hybrid being configured similarly, and each having four ports, the first and second ports being designated input ports and the third and fourth ports being designated output ports, wherein, power supplied to an input port is divided and supplied to the two output ports in quadrature phase relationship,

(b) a first and a second zero degree power divider, each divider having an input and a first and a second output port,

(c) a 180 degree phase shifter having an input and an output port, and,

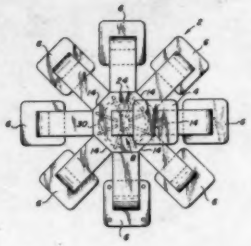
(d) means for making multiple connections, said means connecting the third port of the first quadrature hybrid to the input port of the first power divider, the fourth port of the first quadrature hybrid to the input port of the second power divider, the first output port of the first power divider to the first port of the second quadrature hybrid, the second output port of the first power divider to the first port of the third quadrature hybrid, the first output port of the second power divider to the second port of the second quadrature hybrid, the second output port of the second power divider to the input port of the 180 degree phase shifter, and the output port of the 180 degree phase shifter to the second port of the third quadrature hybrid, to provide a system in which a signal applied to the first port of the first quadrature hybrid will be divided and emerge from the fourth port of the second second quadrature hybrid and the third port of the third quadrature hybrid in quadrature phase relationship and with amplitudes that are more nearly equal over a wider bandwidth than that provided by any of the component quadrature hybrids forming the system quadrature hybrid.

4,673,899

H-PLANE STACKED WAVEGUIDE POWER DIVIDER/COMBINER

Nils V. Jespersen, Lansdale, Pa., and John P. Quine, Albany, N.Y., assignors to General Electric Company, Fairfield, Conn.

Filed Sep. 23, 1985, Ser. No. 779,375
Int. Cl.[4] H01P 5/12
U.S. Cl. 333—137 **19 Claims**



1. A compact waveguide power combiner/divider having low reflection and dissipation loss, comprising:

(a) a radial waveguide having a cylindrical wall and first and second opposing spaced apart walls coupled to the cylindrical wall for defining a chamber, the first wall having a central opening and the cylindrical wall having a plurality of respective arcuately spaced apart openings;

(b) a coupling pin axially arranged within said radial waveguide for coupling energy between the central opening and said radial waveguide;

(c) mode suppression means coupled to said radial waveguide and including a plurality of radially arranged slots, a respective one of the slots disposed between adjacent ones of the spaced apart openings, respectively, the mode suppression means for suppressing undesirable modes;

(d) tuning means connected to said radial waveguide for optimizing coupling of undesired modes with said slots; and

(e) absorbing means coupled to said mode suppression means for absorbing undesired modes from said slots, whereby undesired modes are isloated from desired modes with low reflection and dissipation losses.

4,673,900

DISCOID CAPACITOR STRUCTURE

Michael F. Blamire; Peter F. Briscoe, both of Carrying Place; Douglas D. McLeod, Frankford; B. Kingsley Doolittle, Trenton, all of Canada, and Michael J. Roach, Pleasant Gap, Pa., assignors to Murata Erie North America, Ltd., Trenton, Canada

Filed Apr. 25, 1985, Ser. No. 727,036
Claims priority, application Canada, Aug. 14, 1984, 460944
Int. Cl.[4] H03H 7/01; H01G 7/00
U.S. Cl. 333—167 **7 Claims**

1. A capacitive filter for use in electronic circuitry, the filter comprising:

a tubular casing;

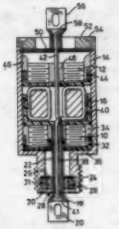
a round central lead having ends projecting beyond the casing;

a discoid capacitor having a central opening through which the lead extends, the capacitor extending radially between a first conductive termination adjacent the lead and a second conductive termination adjacent the casing, and having the first and second ends spaced axially;

solder attaching said first termination of the capacitor to the lead and said second termination to the casing at said first end of the capacitor; and

an electrically non-conductive sealing element having a central opening smaller in diameter than the round central lead and extending radially, the element being at said

second end of the capacitor and being forced over the lead so that it is deformed about the lead for sealing engagement with the lead about said central opening, the element also being in sealing engagement with the inner wall of the



casing and extending towards said first end between the casing and the capacitor so that the solder and flux used to connect the capacitor at said first end is contained at said second end by the sealing element to prevent flow past the capacitor during manufacture.

4,673,901

ELECTRICAL FILTER OPERATING WITH ACOUSTIC WAVES

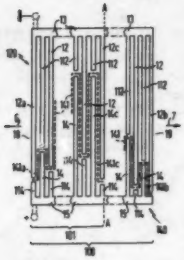
Ekkehard Ehrmann-Falkenau, Munich; Richard Veith, Unterhaching, and Wolfgang Till, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 18, 1985, Ser. No. 788,877

Claims priority, application Fed. Rep. of Germany, Oct. 26, 1984, 3439340; Jul. 11, 1985, 3524825

Int. Cl.[4] H03H 9/64

U.S. Cl. 333—196 **9 Claims**



1. An electrical filter for operation with acoustic waves, comprising:

an interdigital transducer formed of first and second comb structures each having a busbar and a plurality of fingers extending therefrom, fingers of the first comb structure being intermeshed with and overlapping alongside fingers of the second comb structure;

the second comb structure connecting to a relatively high potential and the first comb structure connecting to a reference potential;

the finger overlaps defining the predetermined transformation function and wherein a serpentine curve is defined representing the weighting, said serpentine curve defining an overlap envelope running from one end of the transducer to the other and between all the overlaps defined by an active finger from the first comb structure and an adjacent active finger from the opposite second comb structure;

inside edges of the busbars from which the fingers extend of the first and second comb structures extending parallel to one another;

each end of the overlap envelope at the respective ends of the transducer terminating substantially closer to the second comb structure busbar connected to the high potential than to the first comb structure busbar;

at each end of the transducer a last of the overlapping fingers being a finer of the first comb structure connected to the reference potential; and

the last active finger of the first comb structure at at least one end extending such that its end terminates substantially at but is not in contact with the busbar of the second comb structure connected to the high potential.

4,673,902

DIELECTRIC MATERIAL COAXIAL RESONATOR FILTER DIRECTLY MOUNTABLE ON A CIRCUIT BOARD

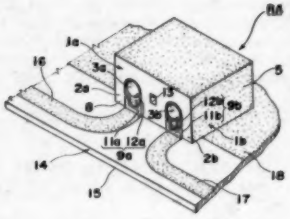
Tomoyuki Takeda, Nagaokakyo, and Yoji Ito, Takatsuki, both of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Nov. 15, 1984, Ser. No. 671,741

Claims priority, application Japan, Nov. 25, 1983, 58-222864

Int. Cl.[4] H01P 2/03

U.S. Cl. 333—202 **21 Claims**



7. A multi-stage filter assembly comprising:

(A) a circuit board having thereon at least two signal conductors and a ground conductor;

(B) first and second dielectric coaxial resonators, each said resonator including:

(1) a block member formed of a dielectric material and having an axial through opening formed therein extending from first to second opposite end faces of said block member;

(2) an inner conductive layer formed on an inner peripheral surface of said through opening;

(3) an outer conductive layer spaced from said inner conductive layer by said dielectric material and formed on at least a first lateral side surface of said block member, said outer conductive layer being directly connected to said ground conductor on said circuit board; and

(4) capacitor electrodes on said second end face of said block member and extending from adjacent said inner conductive layer to said first side surface, said capacitor electrodes being directly connected to a respective one of said signal conductors on said circuit board and providing a coupling capacity which enables signals to be capacitively coupled between said signal conductors and said respective inner conductive layers; and

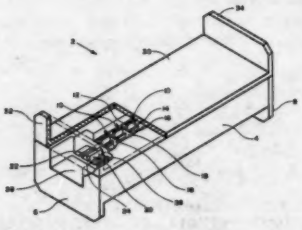
(C) said first and second coaxial resonators being connected to each other at respective second side surfaces thereof which are adjacent said first side surfaces.

4,673,903

EVANESCENT MODE TRIPLE RIDGE LOWPASS HARMONIC FILTER

Abdelmegid K. Saad, Cambridge, Canada, assignor to Com Dev Ltd., Cambridge, Canada

Filed Nov. 2, 1984, Ser. No. 667,824
Claims priority, application Canada, May 28, 1984, 455285
Int. Cl.[4] H01P 1/211
U.S. Cl. 333—210 8 Claims



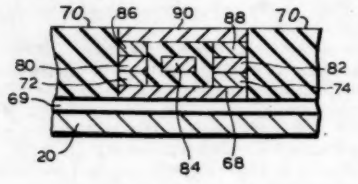
1. A waveguide lowpass filter comprising a filter body with successive groups of three separate ridges formed therein, said groups being spaced longitudinally throughout said filter with spaces there between, all ridges being parallel to one another in a longitudinal direction, said groups being associated with shunt capacitances in a passband and stopband, said spaces between successive groups being associated with series inductances in an evanescent mode in the passband, each group having one centre ridge and two side ridges disposed transversely across said filter, with said side ridges being equally spaced from said centre ridge, said side ridges being smaller in width than said centre ridge, said filter being capable of supporting one mode in the passband and three modes in the stopband.

4,673,904

MICRO-COAXIAL SUBSTRATE

Richard C. Landis, Shelton, Conn., assignor to ITT Corporation, New York, N.Y.

Filed Nov. 14, 1984, Ser. No. 671,276
Int. Cl.[4] H01P 3/06, 3/08
U.S. Cl. 333—238 5 Claims



1. A substrate for supporting electronic components and having a coaxial conductor embedded therein, comprising:

a base defining a first planar layer;

a first conductive strip disposed on a portion of said base;

dielectric material disposed on said base laterally adjacent said first conductive strip and overlying other portions of said base, said first conductive strip and said dielectric material defining a second layer;

a first pair of spaced elongated conductive strips disposed on said second layer and defining a channel therebetween, each of the pair of conductive strips being in electrical contact with said first conductive strip along the length of said strips;

dielectric material disposed on said second layer laterally adjacent and also between said conductive strips, thereby filling said channel and overlying portions of the second layer, said first pair of spaced elongated conductive strips and said dielectric material defining a third layer;

at least three spaced and elongated conductive strips disposed on said third layer, the two outermost of said three spaced conductive strips overlying said first pair of conductive strips and being in electrical contact therewith the third conductive strip being disposed between said two outermost conductive strips and over said channel said third conductive strip forming a conductor of said coaxial conductor;

dielectric material disposed on said third layer laterally adjacent and also between said conductive strips and overlying portions of the third layer, said three conductive strips and said dielectric material defining a fourth layer;

a second pair of spaced elongated conductive strips disposed on said fourth layers, each of the second pair of conductive strips being in electrical contact with the outermost two of the three conductive strips of the fourth layer along the length thereof;

dielectric material disposed on said fourth layer laterally adjacent and also between said second pair of conductive strips and over portions of the fourth layer, said second pair of conductive strips and said dielectric material defining a fifth layer;

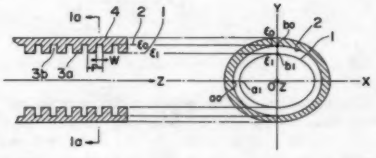
a second conductive strip disposed on said fifth layer overlying said second pair of conductive strips and in electrical contact therewith over the length thereof; and

dielectric material disposed on said fifth layer laterally adjacent said second conductive strip, said second conductive strip and said dielectric material defining a sixth layer, whereby the the conductive strips of the second and sixth layers, the first and second pair of conductive strips and the two outermost conductive strips in the fourth layer form a shield disposed about and coaxial with the conductor formed by the third conductive strip in the fourth layer, said shield being in contact with said base.

4,673,905

CORRUGATED FLLIPTICAL WAVEGUIDE OR HORN

Selichi Yamawaki; Tomoki Obuchi; Noboru Toyama, and Kazuyoshi Shogen, all of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Aug. 20, 1985, Ser. No. 767,495
Claims priority, application Japan, Aug. 22, 1984, 59-174666
Int. Cl.[4] H01P 3/127
U.S. Cl. 333—239 2 Claims

1. A waveguide medium comprising a corrugated hybrid mode excitation member having an elliptical transverse cross section for propagation of electromagnetic energy therethrough, said member being provided with longitudinally spaced parallel corrugations with teeth of the corrugations defining an inner ellipse and grooves of the corrugations defining an outer ellipse, wherein the depths of the corrugation grooves are given by (a_0-a_1) on major axes a_0 and a_1 of said inner and outer ellipses and (b_0-b_1) on minor axes b_0 and b_1 of said inner and outer ellipses, and wherein, in ellipsoidal coordinates (ξ,η, Z);

$a_1=h \cosh \xi_1$

$a_0 = h \cosh \xi_0$
$b_1 = h \sinh \xi_1$
$b_0 = h \sinh \xi_0$

where h is a constant equal to $\frac{1}{2}$ of the spacing between confocal points of an elliptical cross section of said excitation member, and for an even mode ξ_1 and ξ_0 satisfy the following:

$$\frac{J'_{ep}(\xi_1, q^1)}{N'_{ep}(\xi_1, q^1)} = \frac{J_{ep}(\xi_0, q^1)}{N_{ep}(\xi_0, q^1)}$$

and for an odd mode ξ_1 and ξ_0 satisfy the following:

$$\frac{J'_{op}(\xi_1, q^1)}{N'_{op}(\xi_1, q^1)} = \frac{J_{op}(\tau_0, q^1)}{N_{op}(\xi_0, q^1)}$$

where

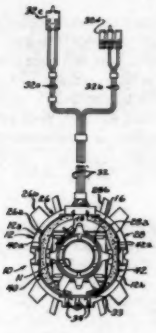
$q^1 = p$ = the order of hybrid mode $(2\pi h/\lambda)^2/4$;
λ = wavelength of said electromagnetic energy;
J_{op} = odd mode primary modified Mathieu function;
J'_{op} = first derivative of the odd mode primary modified Mathieu function;
N_{op} = odd mode secondary modified Mathieu function;
N'_{op} = first derivative of the odd mode secondary modified Mathieu function;
J_{ep} = even mode primary modified Mathieu function;
J'_{ep} = first derivative of the even mode primary modified Mathieu function;
N_{ep} = even mode secondary modified Mathieu function; and
N'_{ep} = first derivative of the even mode secondary modified Mathieu function, whereby the tangential electric and magnetic field components of said electromagnetic energy in a circumferential direction are zero on said inner ellipse.

4,673,906

CRT DEFLECTION YOKE WITH RIGIDIFYING MEANS

William M. Petrow, Prospect Heights, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Jun. 3, 1986, Ser. No. 870,067
Int. Cl.[4] H01F *7/00*
U.S. Cl. 335—210 **9 Claims**



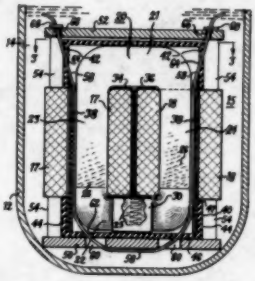
1. A magnetic deflection yoke comprising:
a generally circular, elongated housing;
a generally circular ferrite core positioned upon and around said housing in tight-fitting relation;
a plurality of magnetic deflection coils wrapped around said ferrite core;
a plurality of magnetic field formers positioned on said housing and disposed about said ferrite core; and
a foamed adhesive material disposed in intimate contact with said housing, said ferrite core and magnetic deflection coils and said magnetic field formers for increasing the strength of said deflection yoke and removing heat therefrom.

4,673,907

TRANSFORMER WITH AMORPHOUS ALLOY CORE HAVING CHIP CONTAINMENT MEANS

Albert C. Lee, Hickory, N.C., assignor to General Electric Company, King of Prussia, Pa.

Continuation of Ser. No. 810,664, Dec. 19, 1985, abandoned. This application Jul. 15, 1986, Ser. No. 883,480
Int. Cl.[4] H01F *27/26, 27/30*
U.S. Cl. 336—92 **14 Claims**



1. In a transformer that comprises a tank containing insulating liquid,
(a) a core within said liquid comprising spaced-apart upper and lower yokes and two spaced-apart legs at opposite ends of said yokes, the core comprising superposed laminations of amorphous ferromagnetic alloy,
(b) coil structure surrounding said legs,
(c) said yokes being located outside said coil structure,
(d) a box-like enclosure primarily of electrical insulating material enclosing said lower yoke in a position outside said coil structure,
(e) said enclosure being positioned to capture therein chips of amorphous alloy which might become detached from said core and fall toward the bottom of said tank.

4,673,908

POLARIZED RELAY

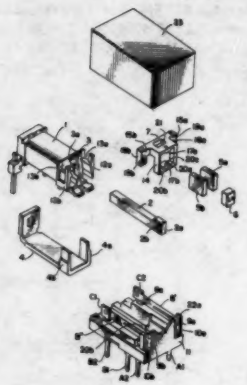
Yoshikiyo Imai, Moriyama, and Yuji Yasuoka, Kyoto, both of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Continuation-in-part of Ser. No. 603,012, Apr. 23, 1984. This application Jan. 29, 1986, Ser. No. 823,662
Claims priority, application Japan, Apr. 22, 1983, 58-61174
Int. Cl.[4] H01H *51/22*
U.S. Cl. 335—79 **5 Claims**

1. A polarized relay comprising:
a bar-like core wound with an electromagnetic coil;
a yoke having a first end connected to a first end of said bar-like core and extending substantially in parallel with said core, a first upstanding leg and a second upstanding leg, both of which are disposed so as to define a space therebetween, wherein a second end of said core is positioned substantially at a mid point of said space;
a movable magnetic block generally U-shaped in section having a pair of pole plates of opposite magnetic polarization;
a holder for holding said movable magnetic block;
wherein, one of said pole plates is positioned in air-gap defined between said first upstanding leg and said core, and the other of said pole plates is positioned in air-gap defined between said second upstanding leg and said core;

movable contacts supported by movable contact means operatively coupled to said movable magnetic block;

stationary contacts provided at least one per one movable contact and disposed face to face with said movable contacts respectively so that said movable contacts selectively contact with said stationary contacts by the operation of said movable magnetic block;



wherein said holder is constructed by a frame holding pole plates and permanent magnet, guide arms laterally slidably mounted on the spool, and depending legs having slits in which movable contact members are inserted and operatively connect with said holder.

4,673,909

THERMAL CUTOUT

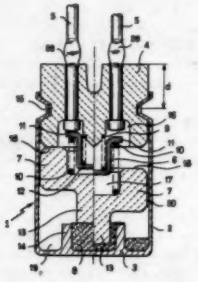
Pierre Schwob, Lyons, and Daniel Bontoux, St Genis Laval, both of France, assignors to SEB S.A., Selongey, France

Filed Jun. 2, 1986, Ser. No. 869,970

Claims priority, application France, Jun. 14, 1985, 85 09030

Int. Cl.⁴ H01H *37/76*

U.S. Cl. 337—407 **9 Claims**



1. A thermal cutout comprising a casing (1) of which at least a portion (3) is of heat-conducting material, two terminals (5) carried by an electrically insulating plug (4) secured to the casing, and an electrically conductive moving element (6) maintained in contact with each terminal (5) by a member (8) which is deformable under the action of heat and which is in turn in contact with the heat-conducting portion (3) of the casing (1), said thermal cutout comprising an electrically insulating member (7) translationally displaceable between a normal position wherein said member has a surface portion (18) in contact with the plug (4) and an opposite surface portion in contact with the heat-deformable member (8), and a fused position wherein an end portion (13) of said displaceable member (7) has penetrated into said deformable member (8) and wherein said surface portion (18) opposite to said end portion (13) is spaced from the plug (4), whereby said displaceable member (7) forms an isolating separation between on the one hand the heat-deformable member (8) and on the other hand the terminals (5) and the electrically conductive moving element (6) and allows electrical disconnection between the terminals (5) and the conductive moving element (6), the terminals (5) and the electrically conductive moving element (6) in said normal position being enclosed within an internal cavity (16, 17) delimited by opposite portions of a wall of said plug (4) and of said displaceable member (7).

4,673,910

MOISTURE SENSITIVE ELEMENT CONTAINING HIGH TEMPERATURE DECOMPOSITION RESIDUE OF ORGANO-SILICON POLYMER AS SENSITIVE ELEMENT

Fusaoki Uchikawa; Morihisa Takeuchi; Kozo Shimamoto; Kunihiko Miyao; Kimio Momiyama, and Hisao Watarai, all of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

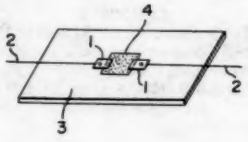
PCT No. PCT/JP81/00410, § 371 Date Sep. 29, 1982, § 102(e) Date Sep. 29, 1982, PCT Pub. No. WO83/01339, PCT Pub. Date Apr. 14, 1983

PCT Filed Dec. 25, 1981, Ser. No. 432,953

Claims priority, application Japan, Sep. 30, 1981, 56-155961; Sep. 30, 1981, 56-155962

Int. Cl.⁴ H01C *7/00*; G01N *27/12*

U.S. Cl. 338—35 **9 Claims**



1. A moisture sensitive element having a moisture sensitive section that changes its electrical resistance according to the humidity of atmosphere, said moisture sensitive section being made of a composition that contains 10 to 95 wt.% of a polymerized organic silicon compound, 5 to 90 wt.% of an amorphous silica powder and 0 to 80 wt.% of other additive components and which is sintered at a temperature higher than 300° C.

4,673,911

ELEVATOR REMOTE-CONTROL APPARATUS

Kenji Yoshida, Gifu City, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 18, 1985, Ser. No. 810,184

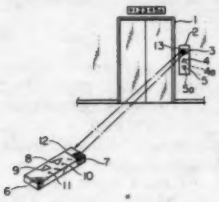
Claims priority, application Japan, Dec. 25, 1984, 59-200307

Int. Cl.⁴ B66B *1/06, 3/00*

U.S. Cl. 187—100 **5 Claims**

1. In an elevator remote-control apparatus wherein a call registration of an elevator is performed with a remote controller at a position remote from a hall button device of the elevator; an elevator remote-control apparatus comprising a transmitter which is disposed in said remote controller and which transmits a remote control signal for the call registration of the elevator, a receiver which is disposed in said hall button device and which receives the remote control signal transmitted from said transmitter and sends a signal for a predetermined call registration to an elevator control device, a transmitter which is disposed in said hall button device and which transmits a predetermined reponse signal to said remote controller on the

basis of an acceptance signal that has been sent in accordance with the call registration by said elevator control device, a receiver which is disposed in said remote controller and which receives the response signal from said transmitter of said hall



button device, and response lamps for displaying the call registrations, which are disposed in said remote controller and which are respectively turned 'on' in accordance with the corresponding response signals that have been received by said receiver of said remote controller.

4,673,912

VEHICLE-MOUNTED TRIGGERING DEVICE AND METHOD OF PREVENTING FALSE MALFUNCTION ALARMS IN SUCH A TRIGGERING DEVICE

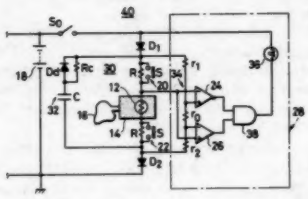
Toru Kumasaka, Osaka; Koichi Kamiji, and Toshikazu Ohya, both of Tochigi, all of Japan, assignors to NEC Home Electronics Ltd., Osaka and Honda Giken Kogyo Kabushiki Kaisha, Tokyo, both of, Japan

Filed May 30, 1985, Ser. No. 739,234

Claims priority, application Japan, May 31, 1984, 59-81477[U]

Int. Cl.[4] B60Q *1/00*

U.S. Cl. 340—52 R **11 Claims**



1. A vehicle-mounted triggering device comprising:

detecting means, mounted on said vehicle, for generating a detection signal in response to detection of a predetermined condition of said vehicle;

an actuating circuit responsive to said detection signal;

an auxiliary power supply, coupled to a primary power supply and to said detecting means and said actuating circuit, for providing a voltage to said detecting means and said actuating circuit;

unidirectional energizing means for charging said auxiliary power supply from said primary power supply; and

trouble detecting means for comparing a voltage associated with said actuating circuit with a reference voltage directly related to said voltage of said auxiliary power supply and generating an alarm in response to a predetermined comparison.

4,673,913

ZIGZAG RUNNING WARNING SYSTEM FOR AUTOMOTIVE VEHICLES

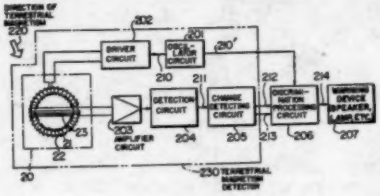
Shigeyuki Akita, Okazaki, and Yoshiyuki Kago, Aichi, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Sep. 15, 1982, Ser. No. 418,529

Claims priority, application Japan, Oct. 28, 1981, 56-173377

Int. Cl.[4] B60Q *1/00*; G01C *17/28*

U.S. Cl. 340—52 R **3 Claims**



1. A zigzag running warning system for an automotive vehicle, comprising:

a magnetic sensor having an annular core, an excitation coil wound uniformly on said annular core, and a sensing coil wound to traverse said annular core;

an oscillator circuit for oscillating at a given frequency;

a driver circuit for receiving oscillations from said oscillator circuit and driving said excitation coil in response thereto;

an amplifier circuit for amplifying an output signal of said sensing coil which varies in amplitude in response to the superposition of terrestrial magnetism and magnetism produced by said excitation coil whenever it is driven by said driver circuit;

a detection circuit for envelope detecting an output signal of said amplifier circuit;

a change detecting circuit for generating an electric signal as a signal indicating that the direction of travel of said vehicle is changed in excess of a predetermined value when an output signal of said detection circuit is higher than a predetermined value;

an electronic unit responsive to said electric signal from said change detecting circuit to discriminate zigzag running of said vehicle as a condition existing when the direction of the terrestrial magnetism with respect to the direction of travel of said vehicle changes alternately with time, and to generate a warning signal when said zigzag running is discriminated; and

warning means responsive to a warning signal from said electronic unit for issuing a warning against said zigzag running condition.

4,673,914

KEYLESS AUTOMOBILE DOOR LOCK/UNLOCK, IGNITION SWITCHING AND BURGLAR ALARM SYSTEM

Ki-Chang Lee, 125-6 Jongam-dong, Sungbuk-ku, Seoul 132, Rep. of Korea

Filed Mar. 20, 1984, Ser. No. 591,507

Int. Cl.[4] B60R *25/04*

U.S. Cl. 340—64 **11 Claims**

1. A keyless locking and power system for a vehicle, comprising

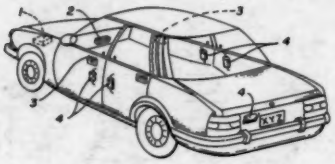
a door locking circuit and an ignition circuit;

a code sensing circuit for producing an unlocking signal;

a latch circuit for connecting said ignition circuit to the vehicle battery power; said latch circuit having alternative "unlock" and "lock" modes for, respectively, connecting said ignition circuit to said battery power, and disconnecting said ignition circuit from said battery power;

means connecting said code sensing circuit to said door locking circuit to effect the unlocking of vehicle door locks in response to an unlocking signal produced by said code sensing circuit;

means connecting said code sensing circuit to said latch circuit to effect the shifting of said latch circuit to said "unlock" mode, in response to an unlocking signal produced by said code sensing circuit;



said code sensing circuit including code sensing input means mounted on the exterior of the vehicle, for inputting a locking or unlocking code; and

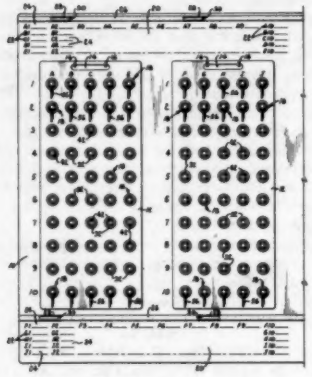
said code sensing input means comprisng at least one push button switch mounted on the exterior of the vehicle, and means for counting the number of closures of each of said push button switches and converting said switch closures to binary codes.

4,673,915

KEY STORAGE AND MONITORING SYSTEM

Richard G. Cobb, 605 South First, Apt. #1, Norfolk, Nebr. 68701

Filed Dec. 12, 1985, Ser. No. 808,085
Int. Cl.[4] G08B *5/00, 5/22*
U.S. Cl. 340—330 **20 Claims**



1. Apparatus for storing and monitoring articles such as keys to be accessed by a plurality of authorized users each assigned a different user code, said apparatus comprising:

a storage board for receiving and holding the articles;

a plurality of storage pegs arranged on said storage board in a preselected array, each peg corresponding to a different one of the articles and each peg being adapted to receive and hold the article to which the peg corresponds;

a plurality of user code indicator members on said board each corresponding to a different storage peg and each being supported on the storage board for movement among a plurality of different positions respectively designating the different user codes assigned to the authorized users;

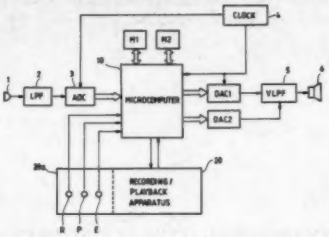
whereby when a particular article is to be removed from its peg by an authorized user, the indicator member corresponding to the peg for said particular article can be moved to the position thereof which designates the user code assigned to said authorized user to inform subsequent users of the identity of the user in possession of said particular article.

4,673,916

METHOD AND SYSTEM FOR DECODING A DIGITAL SIGNAL USING A VARIABLE FREQUENCY LOW-PASS FILTER

Masatsugu Kitamura, Atsugi; Mitsuaki Tanaka, Fujisawa, and Hiroyuki Takekura, Sagamihara, all of Japan, assignors to Victor Company of Japan, Limited, Japan

Filed Mar. 15, 1983, Ser. No. 475,404
Claims priority, application Japan, Mar. 26, 1982, 57-48255
Int. Cl.[4] H03K *13/02*
U.S. Cl. 340—347 SH **4 Claims**



1. A data compression method for storage and readout of data samples comprising the steps of:

(a) preliminarily sampling an analog signal at a predetermined frequency;

(b) converting the preliminarily sampled signal to digital code;

(c) storing the digitally encoded signal in a buffer memory;

(d) selecting variable sampling intervals equal to or greater than intervals corresponding to said predetermined frequency used in said step of preliminarily sampling in accordance with an instantaneous frequency of the stored signal;

(e) sampling signals stored in said buffer memory at said selected sampling intervals;

(f) storing data identifying said sampling intervals of said sampling step and further including amplitude data representative of the stored signals from said buffer memory sampled in said sampling step;

(g) transferring the sampled signals including said sampling intervals and said amplitude data to a storage means;

(h) reproducing the data stored in said storage means by:

(i) feeding said amplitude data to first converting means;

(ii) feeding said sampling interval data to second converting means;

(iii) converting said amplitude data to analog form;

(iv) providing said converted analog form analog data to a variable frequency low-pass filter means;

(v) varying a cut-off frequency of said variable frequency low-pass filter means in accordance with said sampling interval data fed to said second converting means, thereby setting the cut-off frequency to be equal to or lower than one half the sampling frequency corresponding to said sampling intervals used to sample the signals stored in said buffer means,

(i) outputting the signals from said variable frequency low-pass filter means, and

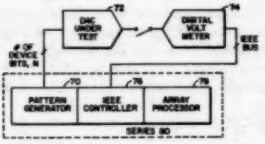
(j) converting the sampling interval data fed to said second converting means to analog form for providing a control signal to said variable frequency low-pass filter means for

varying the cutoff frequency thereof to correspond to the instantaneous frequency of the stored signal.

4,673,917
METHOD AND APPARATUS FOR MINIMIZING DIGITAL-TO-ANALOG CONVERTER CORRECTION TRIMS

William J. Urschel, Yellow Springs, Ohio, and Edwin A. Sloane, Los Altos, Calif., assignors to Fairchild Semiconductor Corporation, Cupertino, Calif.

Filed Jul. 18, 1984, Ser. No. 631,958
Int. Cl.⁴ H03M 1/10
U.S. Cl. 340—347 CC **4 Claims**



1. In a DAC post-correction system that utilizes stored correction terms for generating an analog correction signal, a process for calibrating said correction system comprising:

generating the actual transfer characteristic of the DAC;

performing a Walsh transform of the actual transfer characteristic to generate a first set of binary Walsh terms;

transforming the Walsh terms in said first set into the log domain by taking the log of the absolute value of each term in said first set of Walsh terms to generate a set of log domain Walsh terms;

generating a second set of log domain Walsh terms corresponding to a linear transfer characteristic with the terms in said second set being on a straight line in the log domain having an intercept determined by the slope of said linear transfer characteristic;

fitting said first set of log domain terms to said straight line corresponding to said second set of log domain Walsh terms to determine the deviation of a given term in said first set from said straight line;

taking the exponential of said deviation in the log domain to generate a set of Walsh correction terms indicating the magnitude of the error of a corresponding Walsh term in the first set; and

adjusting the values of said stored correction terms to equal the values of said Walsh correction terms.

4,673,918
LIGHT GUIDE HAVING FOCUSING ELEMENT AND INTERNAL REFLECTOR ON SAME FACE

Robert Adler, Northfield, and John M. Jarosz, Skokie, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Filed Nov. 29, 1984, Ser. No. 676,039
Int. Cl.⁴ G01V 9/04; G06F 3/02
U.S. Cl. 340—365 P **12 Claims**

1. For use in a touch panel graphics display apparatus having means for producing a plurality of substantially parallel light beams directed across a display surface of said apparatus, an improved light collector means for collecting the light in said light beams and for redirecting it in a substantially common direction substantially perpendicular to said light beams for detection by a common light detector positioned adjacent one end of said light collector means,

said improved light collector means comprising:

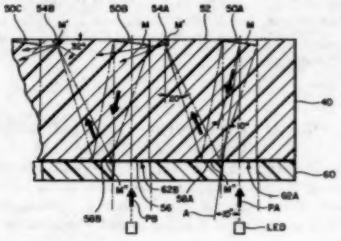
a multi-sided elongated strip of light transmissive material having a longitudinal axis, and being terminated by a light collection station;

a plurality of longitudinally spaced light focusing elements disposed along a first side of said strip;

a like plurality of longitudinally spaced light redirecting elements likewise disposed along said first side of said strip, individually paired with an assigned one of said light focusing elements and individually having a light intercepting surface having transverse dimensions small in comparison to the cross-sectional dimensions of said strip,

said light intercepting surface of each said redirecting element being tilted with respect to said longitudinal axis of said strip;

a like plurality of longitudinally spaced light reflectors disposed along that side of said strip opposite said first side and each located at a point thereon intermediate an assigned one of said light focusing elements and that element's paired light redirecting element,



each said focusing element being oriented and configured to collect light received from a direction substantially perpendicular to said longitudinal axis of said strip and to direct such collected light, via its said assigned reflector, to said redirecting element paired with said focusing element,

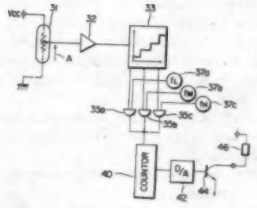
each said focusing element being spaced from its paired redirecting element an optical distance such that said redirecting element is positioned at, or close to, the focal plane of its paired focusing element,

each said light redirecting element being so oriented, relative to said longitudinal axis, as to direct light received from its said paired assigned focusing element toward said light collection station.

4,673,919
MANUAL CONTROL DEVICE

Isaburou Katsoka, Nagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 18, 1984, Ser. No. 632,034
Claims priority, application Japan, Aug. 10, 1983, 58-147513
Int. Cl.⁴ G06F 3/14; G05B 11/01
U.S. Cl. 340—365 A **3 Claims**



1. A manual control device wherein an incremental touch key is depressed by hand so as to bring into agreement a manipulated value and a set value displayed on a manipulated value

indicator and a set value indicator, respectively, said control device comprising:

a pressure sensor for converting a hand contact pressure on the touch key into a voltage level proportional to this pressure,

first means for providing output pulses,

said first means including a level encoder for generating digital signals corresponding to the voltage level of said pressure sensor, pulse generators for generating frequency signals having different frequencies, and AND gates receiving and logically correlating the digital and frequency signals for providing output pulses of a frequency determined by the correlation,

the output pulses having one of a plurality of different frequencies which vary in predetermined discrete steps, each one of the different frequencies corresponding to a range of voltage levels of said pressure sensor,

a counter for counting the output pulses of said first means and for producing a digital output signal, and

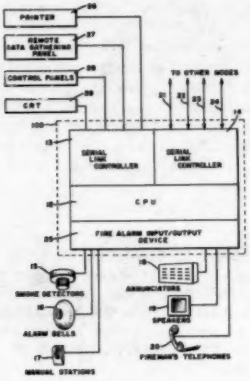
second means for driving the manipulated value indicator in accordance with the digital output signal from said counter.

4,673,920

FIRE ALARM CONTROL AND EMERGENCY COMMUNICATION SYSTEM

Harry D. Ferguson; Kar-Kui Lee; William Oliver; Fat-Cho Kwong; Ronald Young; Jim Hammell; Keith Morrow, all of Owen Sound, Canada, and Rashid A. Chaudhary, Hanson, Mass., assignors to General Signal Corporation, Stamford, Conn.

Filed May 11, 1984, Ser. No. 609,173
Int. Cl.[4] G08B *19/00*
U.S. Cl. 340—521 **3 Claims**



1. In an emergency protection system having a node which is characterized by one or more detectors for sensing alarm conditions, and a computer means for processing such conditions and generating responses for signalling the occurrence of such conditions to other nodes in the system, the improvement which comprises:

(1) A plurality of said nodes, each node being capable of operation independently of the other nodes and each further including:

(a) a communication controller having plural data communication lines;

(b) means responsive to an alarm condition arising at a given node to instruct the communication controller thereat to send changes in alarm condition status to adjacent nodes;

(c) means including said lines for receiving, and replying to, changes in the alarm condition status at adjacent nodes;

(d) means for retransmitting from a given node to a first adjacent node a change in the alarm condition status of another adjacent node received at said given node from said another adjacent node;

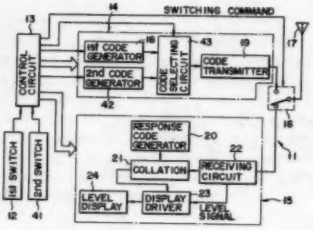
(2) means for separately interconnecting said plural data communication lines of the communication controller of each of said nodes to respective adjacent nodes, whereby changes in the alarm condition status of any one node is communicated to all the other nodes in the system.

4,673,921

APPARATUS FOR FINDING THE LOCATION OF A CAR WITHIN A VAST AREA

Muneo Saito, Yokkaichi, and Shoichi Hayakawa, Aichi, both of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed Jul. 19, 1985, Ser. No. 756,825
Claims priority, application Japan, Jul. 20, 1984, 59-150787
Int. Cl.[4] G08G *1/12*
U.S. Cl. 340—539 **11 Claims**



1. An apparatus for finding the location of a car within a vast area, comprising a portable transmitter/receiver unit and a car-mounted transmitter/receiver unit,

said portable transmitter/receiver unit including:

first code-setting means for storing a particular transmitting code pertinent to the car;

fifth code-setting means for storing an instruction code;

a first switch for generating a car-locating instruction, when closed;

a second switch for generating an instruction to control a device which is provided in the car and which is desirably operated before the driver enters the car;

a first transmitting section for generating a transmission signal containing the transmitting code when said first switch is closed, and for generating a transmission signal containing the instruction code when said second switch is closed;

directional antenna means for transmitting any transmission signal generated by said first transmitting section, and for receiving a response signal containing a response code, from said car-mounted transmitter/receiver unit;

second code-setting means for storing a particular response code pertinent to the car;

a first receiving section for receiving the response code transmitted from said car-mounted transmitter/receiver unit, said first receiving section generating a signal having a level corresponding to the received level of the response signal, and detecting the response code contained in the response signal;

first collating means for collarting the code contained in the signal received by said first receiving section, with the response code set in said second code setting means, and for generating a display instruction when the code contained in the signal received by said first receiving section coincides with the response code set in said second code setting means;

display-drive means, responsive to the display instruction from said first collating means, for generating a display-drive signal corresponding to the signal generated by said first receiving section; and

level-display means, responsive to the display-drive signal, for indicating the direction from said portable transmitter/receiver unit to the car when the maximum level of the signal generated by said first receiving section is indicated on the display

said car-mounted transmitter/receiver unit including:

non-directional antenna means;

a second receiving section for detecting a code of a signal received by and said non-directional antenna means;

third code-setting means for storing a code identical to the transmitting code set in said first code-setting means;

fourth code-setting means for storing a code identical to the response code set in said second code-setting means;

sixth code-setting means for storing a code identical to the instruction code set in said fifth code-setting means;

second collating means for collating the code detected by said second receiving section, with the code set in said third and sixth code-setting means, and for generating a first coincidence signal when the detected code coincides with the code set in said third code-setting means, and a second coincidence signal when the detected code coincides with the code set in said sixth code-setting means;

a second transmitting section, responsive to the first coincidence signal from said second collating means, for generating a response signal containing the response code set by said fourth code-setting means;

transmission power supply control means for supplying power to said second transmitting section for a prescribed period of time after said second collating means for generated the first coincidence signal;

response-code transmission means for transmitting the response signal generated by said second transmitting section, through said non-directional antenna means, when power is supplied to said second transmitting section; and

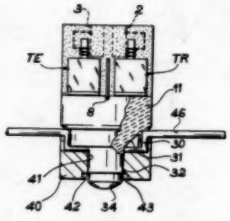
device-control means for controlling said device, in response to the second coincidence signal from said second collating means.

4,673,922

CABLED ULTRASONIC SEAL

René Denis, Brebbia; Giulio Ghiringhelli, Angera, both of Italy, and Alfred Schaal, Massy, France, assignors to Commissariat a l'Energie Automatique, Paris, France and Communaute, European de l'Energie Atomique (Euratom), Luxembourg, Luxembourg

Filed Sep. 18, 1985, Ser. No. 777,412
Claims priority, application France, Sep. 18, 1984, 84 14279
Int. Cl.[4] G09F *3/03*
U.S. Cl. 340—572 **3 Claims**



1. An ultrasonic seal comprising:

an identity module including a transmitting transducer, a receiving transducer, an element forming a delay line for ultrasonic signals transmitted and received by said transducers, and a metal shield anchored in the delay line between the two transducers, said delay line being terminated by a spherical cap for receiving a marking defining in part the acoustic identity of the seal; and

a sealing capsule capable of retaining a cable between said module and said capsule;

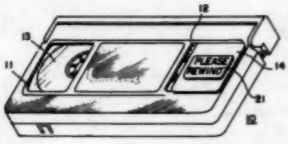
said delay line having an intermediate frustum-shaped part, whose diameter decreases towards the spherical cap and the sealing capsule having a frustum-shaped aperture of the same dimensions as the frustum-shaped part of the identity module, said aperture being engaged against the frustum-shaped part of the module when the capsule is sealed to the module.

4,673,923

ARTICLE SURVEILLANCE USING REACTIVATABLE RESONANT TAGS

John J. Boscoe, Glen Mills, Pa., and Peter L. Gill, Long Valley, N.J., assignors to Checkpoint Systems, Inc., Thorofare, N.J.

Filed May 19, 1986, Ser. No. 864,252
Int. Cl.[4] G08B *13/26*
U.S. Cl. 340—572 **9 Claims**



1. In combination:

a tag bearing an electronic resonant circuit for use in protecting an article against unauthorized removal from protected premises by causing an alarm in response to such removal,

said tag being adapted to be attached to said article, and having when so attached an exposed release liner surface; and

a label bearing an electrically conductive layer adapted to disable said tag from causing said alarm when said label is juxtaposed to said tag,

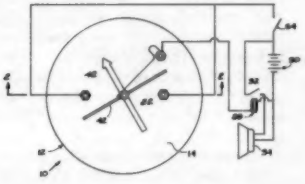
said label having an exposed surface, at least a portion of which is adhesive and by which said label can be adhered to said release liner surface of said tag and subsequently separated from said tag surface without damage to said resonant circuit.

4,673,924

MARITIME WIND SHIFT ALARM SYSTEM AND METHOD OF DETECTING WIND SHIFTS

Ritchie S. Taylor, 512 Agua Pl., Seal Beach, Calif. 90740

Filed Oct. 4, 1985, Ser. No. 784,785
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—601 **10 Claims**



1. A method of detecting wind shifts on a vessel afloat comprising:

providing said vessel with a compass means having a compass jewel and a rose with magnet means thereof mounted in a housing and rotatable about said jewel, and an electrical circuit closure actuating means disposed radially from

said jewel and rotatable with said rose, and with limit contact means having a pair of normally open limits contacts located on said housing,

anchoring said vessel using an anchor so that said vessel rides directly downwind from said anchor tethered by an anchor line extending between said anchor and said vessel, whereby said vessel is free to swing in an arc about said anchor in response to shifts in wind direction,

initially orienting said limit contact means relative to said compass rose so that said limit contacts are located on both sides of said electrical circuit closure actuating means to define allowable variations in wind direction, and

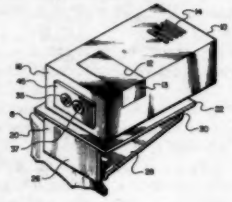
connecting said limit contact means in circuit with an alarm and a power supply, whereby said electrical circuit closure actuating means actuates said limit contact means to close at least one of said normally open limit contacts when said rose rotates on said jewel to bring said electrical circuit closure actuating means into radial alignment with said limit contact means when a change in wind direction beyond one of said allowable variations repositions said vessel relative to said anchor.

4,673,925

BOILING ALARM

Gary D. Whiteman, 284 E. Protrero Rd., Thousand Oaks, Calif. 91361

Filed Oct. 26, 1984, Ser. No. 665,184
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—603 **9 Claims**



1. A sensor for indicating when a liquid in a container begins to boil comprising:

(a) a case for housing the sensor;

(b) mounting means on the case attachable to the container for attaching the case above the liquid;

(c) a pair of electrical probes spaced apart a small distance and mounted on the case above the liquid;

(d) collector means in the form of a sheet of nylon between the electrical probes for collecting condensed vapor of the liquid thereon, the collector means being of a material which does not absorb the liquid, which is electrically insulative, and which has a heat capacity substantially greater than the heat capacity of the electrical probe whereby the vapor of the boiled liquid raises the temperature of the collector means slowly so that vapor can condense on the collector means between the electrical probes; and

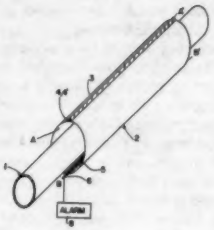
(e) circuit means comprising a source of current, an indicator and the eletrical probes, the electrical probes extending through the sheet of nylon into the case for holding the sheet of nylon on the case, the electrical probes acting as a normally open switch preventing current flowing through the indicator, the water vapor on the collector means allowing current to pass between the electrical probes whereby the indicator signals that the liquid is boiling.

4,673,926

LIQUID CONTAINMENT AND LEAK DETECTION SYSTEM

Walter T. Gorman, 115-14 Beach Channel Dr., Rockaway, N.Y. 11694

Filed Feb. 12, 1985, Ser. No. 701,281
Int. Cl.[4] G08B *21/00*; G01M *3/04*
U.S. Cl. 340—605 **13 Claims**



1. A leak containment and visual detection system for a pipe carrying a liquid which comprises:

a. a length of pipe,

b. a leak detector responsive to said liquid, and

c. a transparent or translucent plastic sheet impermeable to said liquid, wrappable about said pipe,

said detector being disposed below said pipe, said plastic sheet forming an enclosure about said detector and pipe, and

said detector being in proximity to the bottom of said enclosure,

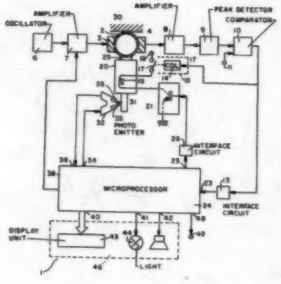
whereby any liquid leaking from said pipe is collected at the bottom of said enclosure and is placed in intimate contact with said detector to facilitate a response by said detector to said liquid while providing containment for said liquid, and said liquid collected by said enclosure being visually detectabel through said enclosure.

4,673,927

APPARATUS FOR DETECTING AND CONTROLLING THE LEVEL OF A GASEOUS FLUID

Domenico Cianciavicchia, Teramo, and Stefano Franceschini, Moglia, both of Italy, assignors to Hospal A.G., Basle, Switzerland

Filed Oct. 25, 1985, Ser. No. 791,487
Claims priority, application Italy, Oct. 31, 1984, 68085 A/84
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—621 **19 Claims**



1. In an apparatus for the detection and control of presence of a gaseous fluid in relation to a predetermined level of liquid in a vessel, the apparatus comprising:

(a) transmitter electro-acoustic transducer means and receiver electro-acoustic transducer means, capable of being placed in face-to-face contact with the vessel in diametrically opposite positions in relation thereto at the predetermined level; the receiver transducer being capable of cooperating with the transmitter transducer means and of emitting an electric signal whose amplitude depends on the amplitude of an acoustic signal provided by the transmitter transducer and on the quantity of gaseous fluid in the vessel between the transducers;

(b) signal generating means for providing an electric ultrasonic frequency signal to the transmitter transducer means, comprising an oscillator, and an amplifier connected downline from the oscillator, the amplifier having its own current generator controlled by a periodic signal coming from the output of a microprocessor processing means, and capable of periodically activating and deactivating the current generator;

(c) signalling means for signalling an alarm condition;

(d) means for comparing the electric signal provided by the receiver transducer means with an electric reference signal, said comparing means being capable of triggering an alarm signal to the signalling means each time the electric signal provided by the receiver transducer means diverges from a predetermined value of the reference signal: the improvement comprising:

(e) actuating means for modifying the level of the liquid in the vessel in response to an alarm condition;

(f) said microprocessor processing means connected to the signal generating means and to the comparing means, capable one of (fa) periodically interrupting the electric signal to the transmitter transducer for a predetermined period of time and of checking accordingly the presence of the alarm signal, and (fb) receiving the alarm signal produced by the presence of the gaseous fluid in the vessel between the transmitter transducer means and the receiver transducer means and, in each one of these two cases (fa and fb), of controlling at least one of the two actuating means and the signalling means.

4,673,928

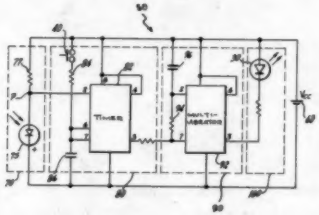
FUSE CAP WARNING LIGHT

Raul Guim, 834 Venetia, Coral Gables, Fla. 33134

Continuation-in-part of Ser. No. 596,368, Apr. 3, 1984, abandoned. This application Feb. 18, 1986, Ser. No. 830,189

Int. Cl.[4] G08B *21/00*

U.S. Cl. 340—638 **6 Claims**



1. A self-powered warning device for round fuse caps having an exposed fuse element, comprising:

A. an adapter casing adapted to be removably mounted over said fuse cap;

B. photosensitive circuit means mounted inside said casing and adapted to detect the spark of said fuse element when an overload condition occurs;

C. detector circuit means connected to said photosensitive circuit means;

D. light indicator means connected to said detector circuit means so that the occurrence of an overload condition is visually displayed; and

E. battery means to power said photosensitive and indicator means.

4,673,929

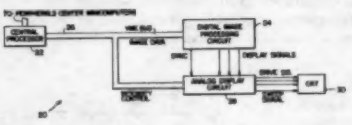
CIRCUIT FOR PROCESSING DIGITAL IMAGE DATA IN A HIGH RESOLUTION RASTER DISPLAY SYSTEM

John E. Nelson, Palos Verdes; Edward T. Grossheim, and Franklin M. Perelman, both of Los Angeles, all of Calif., assignors to Gould Inc., Rolling Meadows, Ill.

Filed Apr. 16, 1984, Ser. No. 600,980

Int. Cl.[4] G09G *1/28*

U.S. Cl. 340—703 **11 Claims**



1. A circuit for processing digital image data for use in a raster display system having an analog display circuit for driving a CRT having a screen, comprising:

data generating means for providing digital image data defining a plurality of pixels to be displayed on a screen of a CRT, for providing a read signal, and for providing attribute data for defining a category of each pixel to be displayed on the screen of the CRT, the pixels being capable of being categorized in a plurality of categories;

image storage means coupled to said data generating means, for storing the digital image data and for reading out the digital image data for each pixel, as pixel data, under the control of the read signal;

attribute storage means, coupled to said data generating means and said image storage means, for storing the attribute data and for providing an attribute signal, as an output in response to receiving from said image storage means the pixel data corresponding to each pixel, the attribute data stored in said attribute storage means being addressed by the pixel data read from said image storage means; and

conversion means, coupled to said attribute storage means and to the analog display circuit, for receiving the attribute signals for the pixels in the form of parallel input data at a first rate, and for generating a display signal for each pixel at a second rate which is greater than the first rate, said conversion means having a plurality of differential line outputs corresponding to the number of categories of pixels, the display signal for each pixel being output on only a selected one of the differential line outputs in dependence upon the attribute signal read from said attribute storage means.

4,673,930

IMPROVED MEMORY CONTROL FOR A SCANNING CRT VISUAL DISPLAY SYSTEM

Joseph Bujalski, Roselle, and John R. Welk, Addison, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 8, 1985, Ser. No. 699,762

Int. Cl.[4] G09G *1/16*

U.S. Cl. 340—703 **20 Claims**

1. A scanning CRT visual display system comprising:

means for providing information signals to be visually displayed on a CRT display monitor;

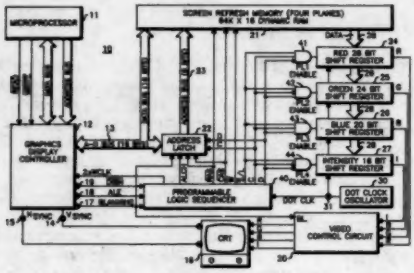
controller means coupled to said information signal providing means for receiving said information signals and providing, during a read mode, address and formatted information signals in response thereto and providing address signals during a display mode, said signals being provided at a rate determined in accordance with the frequency of a received controller clock input signal, said controller means also providing video blanking output pulses and

vertical and horizontal sync pulses which occur within the blanking pulses;

clock means for providing a fixed frequency reference signal;

clock control means coupled to said clock means for receiving said fixed frequency reference signal and selectively providing, in response thereto, said controller clock input signal to said controller means;

memory means coupled to said controller means for receiving from said controller means said formatted information and address signals during said read mode and storing said formatted information signals at corresponding address locations in accordance with said received address signals, said memory means receiving address signals from said controller means during said display mode and in response to at least said address signals providing output display signals corresponding to said stored formatted information signals; and



CRT display monitor means, including a scanning CRT, for receiving said output display signals from said memory means, as well as receiving said video blanking pulses and said vertical and horizontal sync pulses from said controller means, and providing a corresponding visual display in accordance therewith;

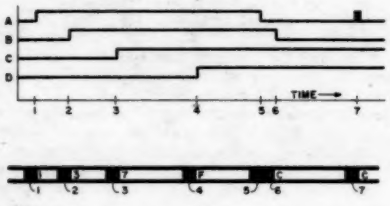
wherein the improvement comprises said clock control means providing said controller clock input signal with a first frequency during said display mode, and providing said controller clock input signal with a second, and substantially higher, frequency during said read mode, whereby the operation of said controller means is sped up during said read mode and said memory means is rapidly loaded by said controller means.

4,673,931

WAVEFORM DATA DISPLAY

Howard G. Cunningham, Jr., Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Mar. 18, 1985, Ser. No. 713,137
Int. Cl.[4] G09G 1/16
U.S. Cl. 340—722 **13 Claims**



1. A method for representing a waveform on a screen comprising the steps of:

a. determining the state of the waveform at regular sampling intervals,

b. determining if the waveform has changed state during a waveform display period comprising a plurality of sampling intervals,

c. displaying a first indicating character on the screen if the waveform has changed state during the display period,

d. displaying a second indicating character on the screen if the waveform has not changed state during the display period, the first and second characters being recognizably different, and

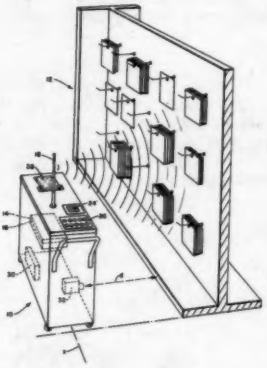
e. repeating steps b, c and d for subsequent waveform display periods such that indicating characters corresponding to successive display periods are successively displayed on the screen.

4,673,932

RAPID INVENTORY DATA ACQUISITION SYSTEM

Jack A. Ekchian, Watertown; Robert W. Hoffman, Arlington, both of Mass.; Leon Ekchian, Woodland Hills, Calif., and Kaigham J. Gabriel, Belmont, Mass., assignors to Revlon, Inc., New York, N.Y.

Filed Dec. 29, 1983, Ser. No. 566,534
Int. Cl.[4] H04Q 9/12
U.S. Cl. 340—825.54 **18 Claims**



1. A method of identifying and determining the number of comingled stationary items by group distributed over an interrogation area, comprising the steps of

assigning a unique transmit/receive frequency to each group of corresponding items,

from a remote location, transmitting to said interrogation area at at least one group-specific frequency,

reradiating a different unique specific frequency from each item in the interrogation area belonging to the specific group,

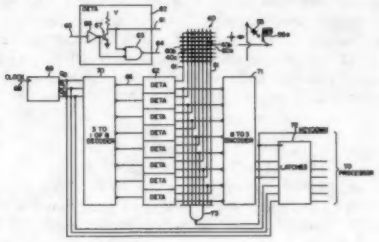
receiving the reradiated group-specific frequency at said remote location,

converting the received signal strength for said specific group to measured data related to the quantity of items in the specific group in the interrogation area.

4,673,933
SWITCH MATRIX ENCODING INTERFACE USING COMMON INPUT/OUTPUT PARTS

Jerry R. Bauer, San Jose, Calif., assignor to American Microsystems, Inc., Santa Clara, Calif.

Filed Nov. 14, 1983, Ser. No. 551,440
Int. Cl.⁴ H04Q *1/00*
U.S. Cl. 340—825.94 **7 Claims**



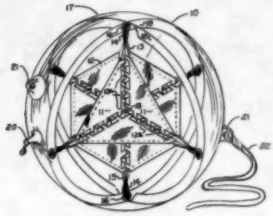
1. A circuit comprising:
a series of input/output ports;
a matrix of switch means;
multiple common input/output lines connected between said input/output ports and said switch means, each switch means connected between a pair of said common input-/output lines such that the state of each said switch means can be scanned;
means for strobing each of said multiple common input/output lines in turn; and
means for recognizing on each said input/output port, only at a time when that input/output port is not being strobed, a signal from any other input/output port which is being strobed, the presence of said signal indicating that a switch means connected between said common input/output lines to said input/output port being strobed and said input/output port not being strobed is closed, and thereby determining which switch means is closed;
wherein said matrix of switch means comprises a pair of switch means connecting the intersection of each of said common input/output lines, a diode connected to each of said switch means to permit electrical flow in opposite directions therethrough, and separate control means operable over each of said switch means to permit electrical flow in opposite directions through each of said common input/output lines; and
wherein each common input/output line intersects from zero to L-1 of said switch means, where L is the total number of said common input/output lines.

4,673,934
INFLATABLE RADAR REFLECTOR

Gene E. Gentry, Alvin, and John H. Bain, Jr., Dickinson, both of Tex., assignors to Gabb Corporation, Houston, Tex.

Filed Nov. 13, 1984, Ser. No. 670,211
Int. Cl.⁴ H01Q *1/34*
U.S. Cl. 342—8 **9 Claims**

1. Improved radar reflector apparatus comprising a collapsible and inflatable radar wave permeable envelope surrounding a radar reflector array having a number of radar wave reflectors which when said envelope is inflated are arranged to form a plurality of corner reflectors, said reflectors being of a flexible material so as to allow collapsing of said reflector array upon collapse of said envelope, the improvement comprising suspension means supporting each of said reflectors within said envelope independently of each other, of said reflectors so that upon inflation of said envelope each of said reflectors floats on said suspension means to seek out optimum planar disposition forming a plane substantially independent of and mutually

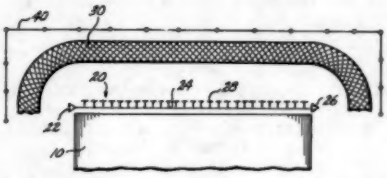


orthoganal to the planes formed by each other of said reflectors.

4,673,935
INSTRUSION DETECTION SYSTEM

Donald B. Spencer, Federal Way, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jan. 26, 1984, Ser. No. 574,039
Int. Cl.⁴ G01S *13/04*
U.S. Cl. 342—27 **6 Claims**



1. A system for detecting the presence of a moving target within a detection zone comprising:
a transmission line for RF energy, the transmission line including means for radiating RF energy travelling through the transmission line into the detection zone and for receiving reflected energy returning from the detection zone;
a transmitter adapted to supply pulses of RF energy into one end of said line; and
a receiver including range gate means for receiving and range gating RF energy from the other end of said line to produce a range gated signal, and doppler detection means for producing a detection signal indicative of the presence of doppler components in the range gated signal.

4,673,936
RESCUE TRANSMITTER APPARATUS

Keigo Kotoh, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 24, 1983, Ser. No. 469,600
Claims priority, application Japan, Feb. 26, 1982, 57-31993
Int. Cl.⁴ G01S *13/80*
U.S. Cl. 342—51 **13 Claims**

1. A rescue transmitter apparatus for emitting a microwave rescue signal upon the occurrence of an accident, comprising:
a power supply unit,
a transmitter unit energizable by said, power supply unit and including a microwave oscillator,
a transmitting antenna receptive of a microwave output from said transmitter unit for emitting the microwave rescue signal,
a case accommodating said power supply unit, said transmitter unit, and said transmitting antenna and being of a size

so as to be attachable to a human body or mountable on clothing for being carried thereby, and

a switch unit mounted in said case for controlling the emission of said rescue signal,

wherein said transmitter unit and said receiver are constructed as flat boards, and

said apparatus further comprises a flat board microwave absorber sandwiched between said transmitter unit and said transmitting antenna.

4,673,937

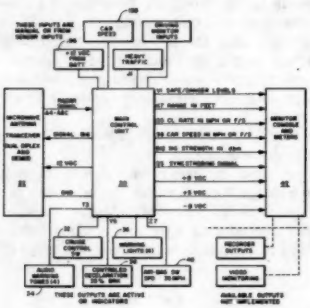
AUTOMOTIVE COLLISION AVOIDANCE AND/OR AIR BAG DEPLOYMENT RADAR

John W. Davis, 7817 Ostrow St., San Diego, Calif. 92111

Filed Jul. 24, 1985, Ser. No. 758,366

Int. Cl.[4] G01S *13/93*

U.S. Cl. 342—72 **37 Claims**



1. An automotive vehicle radar for a vehicle, said vehicle having a body and steerable wheels comprising:

a transmitter for transmitting an FM CW radar signal of a selected beam width in a selected direction relative to the direction of said steerable wheels;

a receiver for receiving the transmitted radar signals reflected from objects within said selected direction and producing a plurality of separate and distinct analog voltage level signals therefrom, each signal having a different voltage level range which represent different vehicle to object relationships;

vehicle means for producing a plurality of separate and distinct analog DC voltage level signals each having a different range of predetermined value levels and representing different relative vehicle conditions;

summing means for adding together the DC levels of the plurality of separate and distinct analog DC voltage level signals from said receiver and vehicle means and producing a single DC voltage amplitude level signal therefrom equal in amplitude to the total amplitude of the voltage levels thereof;

means for producing a first predetermined analog DC voltage level signal which represents a maximum voltage level of said single DC voltage amplitude level signal for safe vehicle operation;

comparator means for comparing said single DC voltage amplitude level signal with said first predetermined DC voltage level signal and producing a first command signal therefrom only when said single DC voltage amplitude signal exceeds the level of said first predetermined DC voltage level signal.

4,673,938

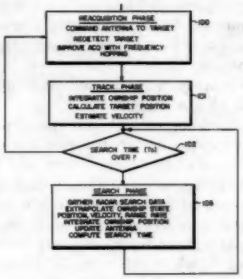
SITUATION AWARENESS MODE

Robert A. Phillips, Crownsville, and Calvin A. Cassidy, Glen Burnie, both of Md., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sep. 5, 1985, Ser. No. 772,813

Int. Cl.[4] G01S *13/74*

U.S. Cl. 342—95 **7 Claims**



1. In a single target tracking radar system which normally tracks a single selected target, wherein said radar system includes an antenna, a servo mechanism which mechanically steers said antenna, a transmitter which generates radar signals which are transmitted out said antenna, a radar receiver which receives target echo return signals from said antenna, a memory, and a system control computer which directs all activities of said radar system, the improvement comprising a procedure to provide a simultaneous search for additional targets while maintaining tracking on said target, said procedure comprising the steps of:

searching for additional targets in a search pattern during a search time while controlling said search pattern so that when said search time expires said antenna is close to the selected target, said searching step thereby minimizing a time it takes said servomechanism to slew said antenna so that it is pointing at said selected target; said searching step includes substeps to compute a scan volume so that when said search time expires, the antenna approaches the selected target position to minimize slew time, said substeps including a first and second calculating substep, a defining substep, a counting substep, and a terminating substep, said first calculating substep including a calculation of the search time and scan width, wherein said first calculating substep calculates said search time using a search time equation which comprises:

$$[(i)\ (A)\ (T_s^2)+(2)\ (SIG)\ (T_s)]/R=E$$

Where:
A = Expected target acceleration (ft/sec^2),
SIG = standard deviation of target speed error (ft/sec),
R = target range (ft),
E = allowable angle error (radians), and
T_S = allowable scan time (sec), said defining substep including defining an angular position marker to indicate limits of said scan volume, said limits being given by said scan width and said angular position marker, said angular position marker being an angular position in azimuth and elevation at which said antenna is positioned upon the completion of each radar pass in said searching step, wherein said angular position marker comprises the azimuth and elevation of said selected target when it is contained on said search pattern and, said angular position marker being the azimuth and elevation closest to that of said selected target when the selected target lies outside the search pattern; said second calculating substep including calculating a number of times the antenna can scan pass the search volume; said counting substep including counting the number of passes said antenna makes during said searching step to obtain a scan count; and said terminating substep including terminating said searching step when said scan count obtained in said counting step reaches the number obtained in said second calculating step;

reacquiring said target by slewing said antenna towards an extrapolated target position, transmitting said radar signals towards said target and collecting target echo return signals to make measurments of said target's position in terms of range, azimuth, and elevation; and

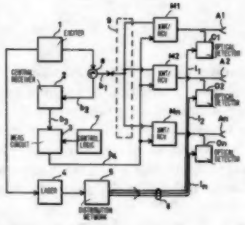
tracking said target by making estimates of said selected target's position and velocity from said range, azimuth and elevation measurements made in said reacquiring step, said tracking step including minimizing the amount of time spent tracking said selected target to increase said search time.

4,673,939

TEST APPARATUS IN A RADAR SYSTEM

John R. Forrest, Aldenham Herts, United Kingdom, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Mar. 6, 1986, Ser. No. 837,050
Claims priority, application Sweden, Mar. 8, 1985, 8501143
Int. Cl.^{4} G01S 7/40
U.S. Cl. 342—174 **2 Claims**



1. Test apparatus in a radar system with an electrically controlled aerial having a plurality of aerial elements (A1–An) and containing a plurality of transmitter-receiver modules (M1–Mn) for continuously, and for each module, causing mutual conformity with regard to both amplitude and phase of the radar signals (FIG. 1) from the modules, said signals being received by the central receiver (2) included in the system, characterized by

(a) a light-generating unit (4) generating a light signal in response to a test signal,

(b) an optical distribution network (5) for distributing the light signal to a bundle (6) of light conductors (l_1–l_n)

(c) a plurality of optoelectrical converters (O1–On), each assigned to one of said modules (M1–Mn) and optically coupled to each of said light conductors (l_1–l_n) for converting the light signals from the light conductors to electrical signals within the radar frequency range.

(d) a detection and measurement unit (3) connected to the system receiver (2) for measuring, in the reception mode of the modules, the amplitude and phase of the test signal which has passed the module, said measurement being carried out in all modules, and

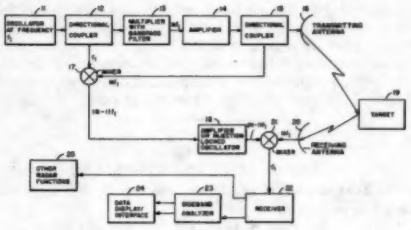
(e) a control logic unit (7) for selecting one of said modules as a reference module, an error signal being generated in the measurement unit (3) relative said reference module for each of the modules, said error signal being disposed for correcting amplitude and phase in respective modules relative said reference.

4,673,940

DETECTION OF VIBRATING TARGET SIGNATURES

Thomas A. Barley; Tony D. Hodgens, and Gustaf J. Rast, Jr., all of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 18, 1982, Ser. No. 447,077
Int. Cl.^{4} G01S 13/50
U.S. Cl. 342—192 **1 Claim**

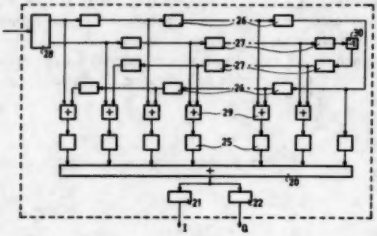


1. In a radar system having a transmitter transmitting a radar signal towards a moving target and having a detective device for detecting reflected radar signals reflected from said moving target; the improvement comprising a sideband analyzer connected to said detective device so as to have outputs which identify vibration characteristics of the moving target and said sideband analyzer provides for separation of AM sidebands and FM sidebands outputs for identification, acquisition and tracking of the target, a receiving antenna; a first mixer having two inputs and an output; and a radar receiver; a generating device connected to one of the inputs of said mixer; said antenna being connected to the other input of said mixer so as to supply the reflected radar signal from said target to said mixer; said generating device generating a frequency such that when mixed with the signal received by said antenna will produce at the output of said mixer a frequency that contains desired vibration characteristics of the target; an input of said reciver being connected to the output of said mixer, an output of said radar receiver being connected to said sideband analyzer; said generating device comprises an oscillator; a multiplier having an input connected to an output of said oscillator, an output of said multiplier being connected to said transmitter; a second mixer having a first input connected to the output of said oscillator; a second input of said second mixer being connected to the output of said multiplier; and an output of said second mixer being connected to the input of said first mixer.

4,673,941
DIGITAL PULSE COMPRESSION FILTER

Jacobus Van Der Mark, Apeldoorn, Netherlands, assignor to Hollandse Signaalapparaten B.V., Hengelo, Netherlands

Filed Nov. 19, 1984, Ser. No. 672,517
Claims priority, application Netherlands, Dec. 7, 1983, 8304210
Int. Cl.[4] H03H 17/00; G01S 7/28
U.S. Cl. 342—201 4 Claims

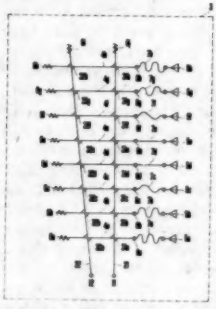


1. A digital pulse compression filter for a radar or sonar transmitting and receiving unit arranged for the generation and transmission of frequency-modulated transmitter pulses, the reception of echo signals, and the conversion of these signals into sampled and digitized signals, the sampling frequency (f_s) thereof being equal to about four times the center frequency (f_o) of the sampled and digitized signals and greater than about twice the bandwidth (Δf) of said signals, characterized in that the pulse compression filter comprises a time correlation circuit supplied with the sampled and digitized signals and with signals representing a replica of the transmitter pulse, one of the two types of signals supplied to the correlation circuit being correlated with the orthogonal components of the other type of signals supplied to the correlation circuit to obtain the orthogonal components of the compressed pulse.

4,673,942
ARRAY ANTENNA SYSTEM

Hiroshi Yokoyama, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Nov. 6, 1984, Ser. No. 668,800
Claims priority, application Japan, Nov. 9, 1983, 58-210344
Int. Cl.[4] H01Q 3/26
U.S. Cl. 342—368 8 Claims



1. A multibeam array antenna comprising:

a plurality of first series power feed lines, the number of which is equal to that of beams to be formed concurrently, each of said plurality of first series power feed lines having an input power port at one end thereof and load element connected to the other end thereof;

a plurality of second series power feed lines intersecting said plurality of first series power feed lines to form a matrix, each of said plurality of second series power feed lines having an output terminal at one end thereof and a load element connected to the other end thereof;

a plurality of radiation elements, one radiation element corresponding to each of said output terminals and including a central radiation element located at a central portion of an aperture of said array and additional radiation elements positioned at given distances on each side of said central element;

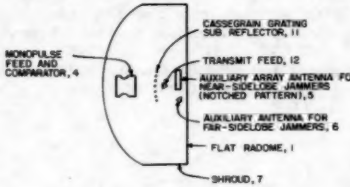
a plurality of directional couplers disposed at the intersections of said matrix; and

a first phase adjusting means comprising a plurality of delay lines connected between said plurality of radiation elements and said corresponding output terminals of the second series power feed lines, respectively, the lengths of said delay lines being determined such that the delay line connected with said central radiation element has a given reference length, and the delay lines connected with the additional radiation elements have lengths which are different from said reference length by amounts in proportion to said given distances between each additional radiation element and said central radiation element, thereby the phases of radiations from said radiation elements are distributed symmetrically with respect to the central portion of the aperture as compared to the phase distribution at the time of in-phase excitation.

4,673,943
INTEGRATED DEFENSE COMMUNICATIONS SYSTEM ANTIJAMMING ANTENNA SYSTEM

Peter W. Hannan, Smithtown, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sep. 25, 1984, Ser. No. 654,338
Int. Cl.[4] H04K 3/00; H01Q 25/04, 19/19
U.S. Cl. 342—367 7 Claims


CASSEGRAIN GRATING SUB REFLECTOR, 11
MONOPULSE FEED AND COMPARATOR, 4
TRANSMIT FEED, 12
AUXILIARY ARRAY ANTENNA FOR NEAR-SIDELOBE JAMMERS (NOTCHED PATTERN), 5
AUXILIARY ANTENNA FOR FAR-SIDELOBE JAMMERS, 6
FLAT RADOME, 1
SHROUD, 7

1. In combination with a signal processing system and an adaptive processor, an antijamming antenna system receiving and transmitting a desired communication signal and mainbeam and sidelobe jamming signals, said antijamming antenna system outputting a sum, azimuth difference, elevation difference signals, said antijamming antenna system outputting near-sidelobe and far-sidelobe signals, said antijamming antenna system comprising:

a curved parabolic reflector having a focus and, receiving said jamming signals and a desired communication signal;

first, second, third and fourth waveguides which are located in the focus of said curved parabolic reflector, said first, second, and third and fourth waveguides receiving and conducting all signals into said antijamming antenna system and having interior dimensions designed to conduct signals having the frequency of said desired communication signal, said first waveguide being a single mode horn; said second waveguide being a multimode horn fixed between said first and third waveguides; said third waveguide being a multimode horn;

said fourth waveguide being a single mode horn attached to said third waveguide;

a comparator means being electronically attached and receiving signals from said first, second, third and fourth waveguides, said comparator means outputting said sum, azimuth, difference and elevation difference signals;

a first and second auxiliary antenna means each having a null in the direction of said desired communication signal and each being fixed in proximity to said curved parabolic reflector, said first auxiliary antenna means being an array of crossed-slot radiators which is fixed in proximity to said curved parabolic reflector, said array having an aperture size in range of 3 to 10 wavelengths of said desired communication signal, said array having a null in the direction of said desired communication signal, a first electrical connection attached to and receiving from said array only said near-sidelobe signal, and conducting said near-sidelobe signal as an output of said antijamming antenna system;

said second auxiliary antenna means outputting said far-sidelobe jamming signal; and

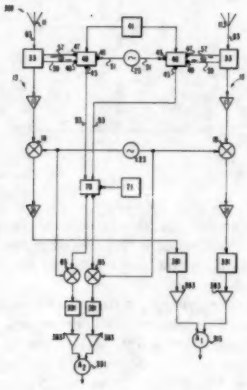
a transmit means being located in the focus of said curved parabolic reflector, said transmit means transmitting an output signal, said output signal being cross polarized to said desired communication signal.

4,673,944

AUTOCALIBRATING INTERFEROMETER

Ross E. Graves, Santa Fe, N. Mex., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 12, 1984, Ser. No. 588,600
Int. Cl.[4] G01S 5/02
U.S. Cl. 342—424 **12 Claims**



1. An autocalibration subsystem for a direction-finding interferometer, said interferometer having first and second antennas, first and second signal channels, and a primary comparator for comparing signals according to a predetermined characteristic, said first signal channel being adapted for transmitting the output of said first antenna to said primary comparator, said second signal channel being adapted for transmitting the output of said second antenna to said primary comparator, said subsystem comprising:

first and second reversing switches, each reversing switch means having an input port, an output port, a third port and a fourth port;

a signal source for providing a calibrate signal to the input port of each of said reversing switches;

a secondary comparator for comparing two signals according to said predetermined characteristic, said secondary comparator having first and second inputs, said first input of said secondary comparator being adapted for receiving a signal from said output port of said first reversing switch, said second input of said secondary comparator being adapted for receiving a signal from said output port of said second reversing switch, said secondary comparator being adapted for detecting the phase difference of signals received at its first and second inputs;

first and second couplers located adjacent respective said antennas, each coupler having first and second inputs and an output, each said coupler output serving as an input to the respective said signal channel, each said first input of each said coupler being electrically connected to the output of the respective said antenna, each said second input of each said coupler being electrically connected to said third port and said fourth port of the respective said reversing switch so that a signal path exists between respective third and fourth ports; and

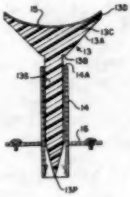
controller means for alternately providing first and second concurrent switch conditions in said reversing switches so that in said first condition each said input port is electrically connected to the respective said third port and each said output port is electrically connected to the respective said fourth port, and so that in said second condition each said input port is electrically connected to the respective said fourth port and each said output port is electrically connected to the respective said third port.

4,673,945

BACKFIRE ANTENNA FEEDING

Harry Syrigos, Malden, Mass., assignor to Alpha Industries, Inc., Woburn, Mass.

Filed Sep. 24, 1984, Ser. No. 653,457
Int. Cl.[4] H01Q 19/10
U.S. Cl. 343—755 **8 Claims**



1. In a backfire feed antenna having a parabolic reflector and a conducting tube coacting to define with a dielectric waveguide an annular gap substantially at the focus of said parabolic reflector, the improved dielectric waveguide comprising,

contiguous stem and cap portions with the cap portion having a concave outside surface symmetrical about the longitudinal axis of the waveguide and formed with a conical outside surface forming a cone angle with a plane perpendicular to said longitudinal axis within the range of 40°–60° with the periphery of said concave outside surface coextensive with the radially outermost edge of said conical outside surface and the angle formed between a line extending from said periphery to the center of said concave outside surface and a plane perpendicular to said longitudinal axis being significantly less than said cone angle,

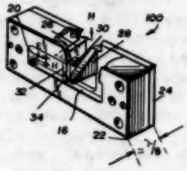
said concave outside surface being coated with conducting material and coacting with said cap portion to comprise means for reflecting energy between said annular gap and said parabolic reflector so that gap rays of energy radiated by said gap illuminate said parabolic reflector between the center thereof and circumferential edge thereof to form a sharp pencil beam oriented along said longitudinal axis with the varying path length between said gap and the coated concave outside surface through said cap portion furnishing the proper delay for each ray to illuminate said parabolic reflector with energy rays relatively phased to concentrate radiation along said longitudinal axis while suppressing side lobes.

4,673,946

RIDGED WAVEGUIDE TO RECTANGULAR WAVEGUIDE ADAPTOR USEFUL FOR FEEDING PHASED ARRAY ANTENNA

John C. Hoover, Roswell, Ga., assignor to Electromagnetic Sciences, Inc., Norcross, Ga.

Filed Dec. 16, 1985, Ser. No. 809,175
Int. Cl.[4] H01Q *13/00*; H01P *1/165*
U.S. Cl. 343—776 **26 Claims**



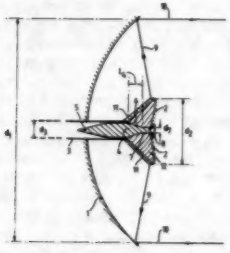
1. A microwave waveguide adaptor comprising:
a rectangular waveguide input/output port;
a ridged waveguide input/output port;
a non-resonant cavity disposed between and physically connecting said input/output ports; and
a parallel plate conductor TEM transmission line structure passing through said non-resonant cavity while remaining electrically separated from walls of the cavity and electrically interconnecting said input/output ports.

4,673,947

CASSEGRAIN AERIAL SYSTEM

Paul Newham, Middlesex, England, assignor to The Marconi Company Limited, England

PCT No. PCT/GB85/00290, § 371 Date Feb. 20, 1986, § 102(e) Date Feb. 20, 1986, PCT Pub. No. WO86/00761, PCT Pub. Date Jan. 30, 1986
PCT Filed Jun. 28, 1985, Ser. No. 834,250
Claims priority, application United Kingdom, Jul. 2, 1984, 8416823
Int. Cl.[4] H01Q *19/19*
U.S. Cl. 343—781 CA **8 Claims**



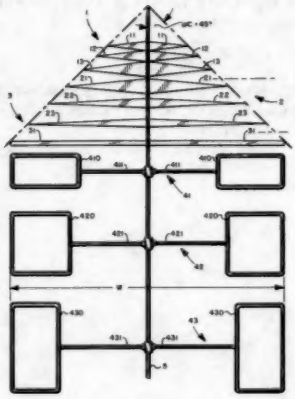
1. A Cassegrain aerial system, comprising:
(a) a main reflector; and
(b) a dielectric feed projecting through said main reflector and including
(i) an elongate inner dielectric member having an end and a dielectric constant,
(ii) a coaxial outer dielectric member closely surrounding said end of said inner dielectric member about an axis and having a dielectric constant, said outer dielectric member diverging away from said main reflector, and having an end face remote from said main reflector,
(iii) a metallic film deposited on said end face and providing a sub-reflector which faces said main reflector,
(iv) said metallic film being supported solely by said outer dielectric member, and
(v) said dielectric constant of said inner dielectric member being greater than said dielectric constant of said outer dielectric member so that said dielectric feed has an effective dielectric constant which decreases continuously from said axis outwards and constrains radiation from said dielectric feed to a narrow beam intercepting said sub-reflector with negligible spillover.

4,673,948

FORESHORTENED DIPOLE ANTENNA WITH TRIANGULAR RADIATORS

Samuel C. Kuo, Saratoga, Calif., assignor to GTE Government Systems Corporation, Mountain View, Calif.

Filed Dec. 2, 1985, Ser. No. 803,699
Int. Cl.[4] H01Q *11/10*
U.S. Cl. 343—792.5 **25 Claims**



20. A foreshortened log periodic antenna comprising a feedline to which are attached a plurality of dipole elements, the elements arranged in four regions along the length of the feedline so as to include:
a first region comprising a series of solid triangular dipoles characterized by substantially constant base/height ratios;
a second region comprising a series of solid triangular dipoles characterized by decreasing base/height ratios;
a third region comprising at least one linear dipole; and
a fourth region comprising a series of foreshortened dipoles, each of the foreshortened dipoles comprising a generally rectangularly perimetered body portion attached through a stem portion to the feedline.

4,673,949

WIDEBAND VHF/UHF RADIO ANTENNA WITH QUARTER-WAVE TRANSFORMER

Jack W. Sheriff, La Jolla, Calif., assignor to Modublox & Co., Inc., La Jolla, Calif.

Filed Sep. 24, 1984, Ser. No. 653,697
Int. Cl.[4] H01Q *1/50, 9/30*
U.S. Cl. 343—825 **11 Claims**

1. A wideband antenna for use with a transceiver operating over a bandwidth extending from a low frequency F_3 to a high frequency F_4, said transceiver having an antenna connecting impedance Z_o, which comprises:
a tubular element;
a toroidal insulator positioned at one end of said tubular element;

a toroidal conductive plug positioned at the other end of said tubular element;

a rod extending coaxially through and beyond said plug, tubular element and insulator, a section of said rod extending from said plug through said tubular element and forming in combination therewith, a quarterwave transformer, the remaining section of said rod extending through and beyond said insulator and forming a half-wave antenna having a resistive impedance Z_a;

means associated with said insulator for minimizing the boundary effect between said transformer and said half-wave antenna; and

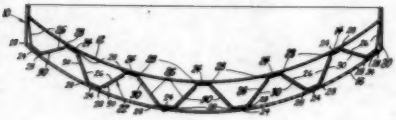
means associated with said plug for stepping up the resistive impedance of said transformer from the connecting impedance Z_t to the resistive impedance Z_a of said half-wave antenna.

4,673,950

ANTENNA AND METHOD FOR FABRICATING SAME

Robert J. Piper, 22494 Ray, Detroit, Mich. 48223, and Helmut F. Homann, 16354 Greenland, Mt. Clemens, Mich. 48045

Filed Jul. 17, 1985, Ser. No. 756,055
Int. Cl.[4] H01Q 15/14
U.S. Cl. 343—912 **8 Claims**



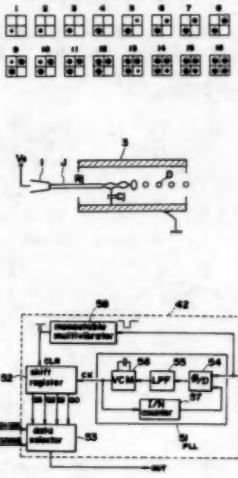
1. A radio signal antenna (10) for receiving radio signals comprising; an inner panel (12) having a curved inner receiving surface (14) for receiving a radio signal, an outer panel (16) in coextensive spaced relationship to said inner panel (12), structural means (18) for interconnecting said panels (12,16) together in predetermined positions relative to one another, characterized by said structural means (18) comprising at least one strip (20) having undulations (22) substantially perpendicular to and undulating between and connected to the respective panels (12,16) to interlock the panels (12,16) together in the predetermined positions for maintaining said inner surface (14) of said inner panel (12) in a predetermined precise position to define a composite antenna (10) of substantial strength and present said inner surface (14) within predetermined close tolerances over the surface thereof; said undulations (22) of said strip (20) including platform portions (24) for engaging said panels (12,16) and straight angulated portions (26) connecting to said platform portions by hinge portions (24).

4,673,951

TONE REPRODUCIBLE INK JET PRINTER

Masayuki Mutoh, Machida, and Shinji Kamiyama, Tokyo, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sep. 27, 1985, Ser. No. 780,821
Claims priority, application Japan, Sep. 29, 1984, 59-204380
Int. Cl.[4] G01D 15/18
U.S. Cl. 346—75 **6 Claims**



1. A tone reproducible ink jet printer in which an ink jet generator and a record medium are moved relative to each other for recording, the ink jet generator including an ejecting means for continuously ejecting an ink from a nozzle, a voltage applying means for applying a pulse voltage to the ink to selectively charge ink droplets and a means for producing a deflection electric field for deflecting a row of charged droplets and permitting a row of uncharged droplets to proceed straight such that one row of uncharged droplets forms one dot on the record medium, said printer comprising:

a means for storing data for tone reproduction including data as to the position to be marked with dots on the record medium and data as to dot diameter;

a reference clock generating means for generating a series of reference clock pulses;

a means for controlling the relative movement of the ink jet generator and the record medium based on said data as to the dot marking position in response to said reference clock pulses;

a pulsewidth controlling means for controlling the pulsewidth of the voltage to be applied by the voltage applying means based on said dot diameter data, said pulse-width controlling means comprising a PLL circuit which oscillates in response to said reference clock pulses at N times the frequency of said reference clock pulses, a shift register which receives an output from said PLL circuit and delivers a plurality of outputs of different phases, and a selection circuit for selecting one of said plurality of outputs of different phases based on said dot diameter data; wherein the numerical value of N which determines the oscillation frequency of said PLL circuit is not smaller than the number of tones associated with the modulation of the dot diameter and is not larger than a jet drop formation frequency divided by the reference clock frequency; and

an oscillator means for controlling the formation of droplets in accordance with said reference clock pulses; wherein

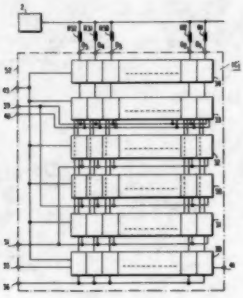
the oscillation frequency of said oscillation means is set to a value approximately equal to a spontaneous drop formation frequency of the ink jet and is effected at M times the frequency of said reference clock pulses, and wherein the numerical value of M is equal to or greater than said value N.

4,673,952

DRIVING DEVICE FOR A THERMAL ELEMENT

Youichi Setoyama, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 18, 1984, Ser. No. 621,395
Claims priority, application Japan, Jun. 16, 1983, 58-108052
Int. Cl.[4] G01D *15/10*
U.S. Cl. 346—76 PH **8 Claims**



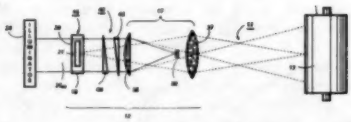
1. A driving device for a thermal element comprising a receiving means for receiving information to be printed, a receiving timing signal, a latch timing signal and a control signal controlling a current conducting time for said thermal element, an input register storing the information to be printed according to said receiving timing signal, a first latch coupled to said input register and storing the information of said input register according to said latch timing signal, a second latch coupled to said first latch for storing the information of said first latch according to said control signal, a third latch coupled to said second latch for storing the information of said second latch according to said latch timing signal and a control circuit coupled to said first and said third latch for driving said thermal element in response to said control signal.

4,673,953

INTERPIXEL NULL SUPPRESSION FOR OPTICAL IMAGE BARS

David L. Hecht, Menlo Park, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 13, 1985, Ser. No. 808,709
Int. Cl.[4] G01D *9/42, 15/14*
U.S. Cl. 346—108 **13 Claims**



1. In combination with an optical image bar for supplying spatially modulated light to form an image composed of a sequence of pixel patterns on an output image plane, each of said pixel patterns containing a plurality of individual pixels and having a nominal image plane pixel pitch, each of said pixels having an image plane diameter that is less than said pixel pitch such that there tend to be interpixel intensity nulls; the improvement comprising

first optical means disposed between said image bar and said image plane for decomposing said light into a plurality of mutually orthogonal, laterally offset, optical field distributions which are redundantly modulated in accordance with said pixel pattern, and

second optical means aligned with said first optical means for transforming said field distributions into respective mutually orthogonal, redundantly modulated, laterally offset intensity profiles and for bringing said intensity profiles to focus simultaneously on a recording medium, thereby causing them to sum with one another on an intensity basis

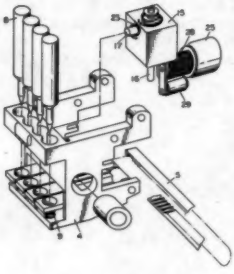
said intensity profiles being laterally offset from one another on said image plane sufficiently to substantially overwrite said interpixel intensity nulls, but insufficiently to cause significant alteration of any neighboring pixels.

4,673,954

MULTI-PEN RECORDING DEVICE

Hiroaki Sakai, Fukuoka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 29, 1984, Ser. No. 676,401
Claims priority, application Japan, Nov. 29, 1983, 58-224752
Int. Cl.[4] G01D *15/16*
U.S. Cl. 346—139 R **18 Claims**



1. A multi-pen recording device comprising:

a frame;

a shaft supported by said frame;

a carriage slidably supported on said shaft;

a pen holding means mounted on said carriage for supporting a plurality of pens;

belt drive means, including a single belt connected between said frame and said carriage, for driving said carriage along said shaft;

pen change means mounted on said carriage for moving an individual pen supported by said pen holding means from a non-writing position to a writing position; and

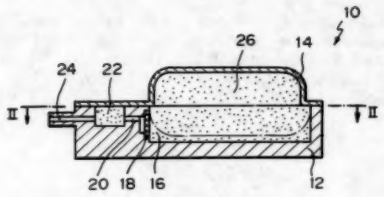
clutch means, connected between said pen change means and said single belt, for positioning said pen change means in a position for moving any selected one of the plurality of pens mounted in said pen holding means into a writing position.

4,673,955

INK RECEPTACLE FOR INK JET PRINTER

Minoru Ameyama, Yokohama; Takuro Isayama; Hiroshi Yamazaki, both of Tokyo; Shuzo Matsumoto; Yasuo Katano, both of Yokohama, and Kyuhachiro Iwasaki, Fujisawa, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jun. 4, 1986, Ser. No. 870,529
Claims priority, application Japan, Jun. 4, 1985, 60-121185
Int. Cl.[4] G01D *15/16*
U.S. Cl. 346—140 R 15 Claims



1. An ink receptacle for an on-demand type ink jet printer in which an ink reservoir for storing ink which is to be ejected from an ink jet head is mounted on a carriage, comprising:

a non-flexible housing made of resin and having a relatively large first ink chamber which stores ink therein and includes an opening which is exposed to outside, a relatively small second ink chamber having an opening which is exposed to outside, a first ink supply channel communicating said first and second ink chambers to each other to supply the ink from said first ink chamber to said second ink chamber, and a second ink supply channel communicating said second ink chamber to the head to supply the ink from said second ink chamber to the head;

at least one flexible film bonded to said housing to cover said openings of said first and second ink chambers to thereby separate said first and second ink chambers from each other, the part of said flexible film which covers said first ink chamber being deformable corresponding to an amount of remaining ink; and

a filter situated between said first ink chamber and said first ink supply channel.

4,673,956

REDUCED VIBRATION IN A TWO PART ASSEMBLY FOR AN IMAGE RECORDING APPARATUS

Hiroo Kobayashi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 842,711, Mar. 19, 1986, abandoned, which is a continuation of Ser. No. 575,223, Jan. 30, 1984, abandoned. This application Aug. 22, 1986, Ser. No. 899,781
Claims priority, application Japan, Feb. 9, 1983, 58-18199[U]
Int. Cl.[4] G01D *15/06, 15/08;* G03G *15/00*
U.S. Cl. 346—160 9 Claims

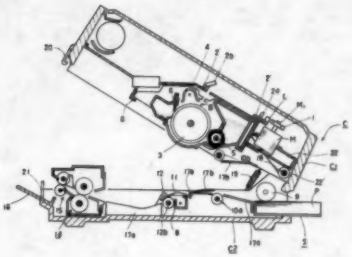
1. An image recording apparatus, comprising:

means for producing an information beam in accordance with an information signal to be recorded;

means for scanningly deflecting the information beam in a major scanning direction;

an assembly for containing therein said information beam producing means, said deflecting means and a photosensitive member, movable in a minor scanning direction, which is exposed to the information beam at an exposure station, said assembly comprising a first assembly section and a second assembly section, said first assembly section being connected to said second assembly section pivotably about shaft means; and

means for supporting said deflecting means in said assembly at a position located adjacent said shaft means, said supporting means being fixed to said first assembly section and engaged with said shaft means.

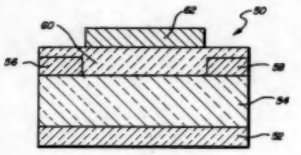


4,673,957

INTEGRATED CIRCUIT COMPATIBLE THIN FILM FIELD EFFECT TRANSISTOR AND METHOD OF MAKING SAME

Stanford R. Ovshinsky, Bloomfield Hills, and Stephen J. Hudgens, Southfield, both of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Continuation-in-part of Ser. No. 609,640, May 14, 1984. This application Aug. 3, 1984, Ser. No. 637,435
Int. Cl.[4] H01L *29/04, 29/54*
U.S. Cl. 357—2 32 Claims



1. An integrated circuit compatible thin film field effect transistor comprising:

a silicon-germanium alloy body, said body having a structure more ordered than amorphous silicon-germanium semiconductor material and less ordered than single crystalline semiconductor material;

source and drain electrodes of amorphous semiconductor material forming rectifying contacts with said body; and

a gate electrode adjacent to and insulated from said body.

4,673,958

MONOLITHIC MICROWAVE DIODES

Burhan Bayraktaroglu, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 31, 1985, Ser. No. 697,301
Int. Cl.[4] H01L *29/90, 27/13, 23/50, 23/34*
U.S. Cl. 357—13 77 Claims

1. A microwave device comprising:

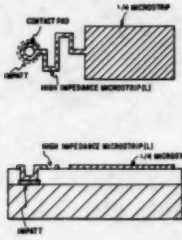
a metal heat sink:

at least one semiconductor active element located on said metal heat sink:

a planar coated dielectric layer overlying said semiconductor active device element and said heat sink, said dielectric layer containing at least one via hole above and extending down to said active element; and

a thin film metallization pattern on said dielectric layer, said

thin film metallization pattern including a portion in said via hole and contacting said active element and including a portion



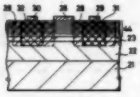
forming a segment of a transmission line in conjunction with said metal heat sink and said dielectric.

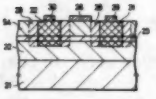
4,673,959

HETEROJUNCTION FET WITH DOUBLY-DOPED CHANNEL

Yasuhiro Shiraki, Hino; Yoshifumi Katayama, Tokorozawa; Yoshimasa Murayama, Koganei; Makoto Morioka, Nishitama; Yasushi Sawada, Kokubunji; Tomoyoshi Mishima, Shiki; Takao Kuroda, Kokubunji, and Eiichi Maruyama, Kodaira, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 27, 1984, Ser. No. 686,661
Claims priority, application Japan, Dec. 28, 1983, 58-246273
Int. Cl.[4] H01L *29/80*
U.S. Cl. 357—22 **15 Claims**





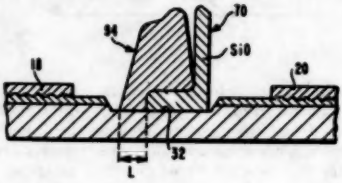
1. A semiconductor device comprising at least first and second semiconductor layers, the first and second semiconductor layers being disposed so as to form a hetero-junction therebetween, the hetero-junction having a channel adjacent thereto on the second semiconductor layer side, the channel having opposite edges; source and drain areas located each at a respective one of the opposite edges of the channel, the source and drain areas extending so as to have portions of the first and second semiconductor layers extending between the source and drain areas; and gate electrode means for controlling transmitting of carriers in the channel; characterized in that both the first and second semiconductor layers, between said source and drain areas, have a portion containing only 10^{16} cm^{-3} or less of an impurity; said portion containing only 10^{16} cm^{-3} or less of an impurity has relatively high impurity concentration regions adjacent opposite sides thereof, such relatively high impurity concentration regions having impurity concentrations ranging from 5×10^{17} to 5×10^{19} cm^{-3}; said first semiconductor layer has a wider forbidden bandgap than that of said second semiconductor layer; and at least one further semiconductor layer is provided adjacent a surface of the first semiconductor layer opposite to the surface of the first semiconductor layer forming the hetero-junction with said second semiconductor layer, said at least one further semiconductor layer having a higher activation efficiency for the impurities of the relatively high impurity concentration regions than that of said first semiconductor layer.

4,673,960

FABRICATION OF METAL LINES FOR SEMICONDUCTOR DEVICES

Pane-Chane Chao, Liverpool, and Walter H. Ku, Ithaca, both of N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Division of Ser. No. 550,284, Nov. 9, 1983, Pat. No. 4,551,905, which is a continuation-in-part of Ser. No. 448,158, Dec. 9, 1982, abandoned. This application Jul. 31, 1985, Ser. No. 760,786
Int. Cl.[4] H01L *29/48, 23/50, 29/44, 29/80*
U.S. Cl. 357—22 **6 Claims**



1. A submicron metal line structure for a semiconductor gate electrode comprising:

a semiconductor wafer having an upper surface;

a source formed on said upper surface;

a drain formed on said upper surface spaced from and generally parallel to said source;

a gate electrode mounted on said upper surface between said source and said drain, said gate electrode having a leg portion engaging and forming a Schottky interface with said upper unitary surface and having an upper, enlarged portion, said enlarged portion being asymmetrical with respect to said leg portion to form a generally inverted-L-shaped cross-section, whereby said leg portion is offset toward said source; and

a gate support wall mounted on said upper surface, said support wall having a generally L-shaped cross-sectional configuration corresponding to the cross-sectional shape of said gate electrode and engaging said gate electrode to mechanically support it on said upper surface.

4,673,961

PRESSURIZED CONTACT TYPE DOUBLE GATE STATIC INDUCTION THYRISTOR

Jun-ichi Nishizawa, Miyagi, and Hisao Kondoh, Osaka, both of Japan, assignors to Research Development, Corporation of Japan, Tokyo, Japan

Filed Mar. 13, 1986, Ser. No. 839,106
Claims priority, application Japan, Mar. 13, 1985, 60-50056
Int. Cl.[4] H01L *29/80*
U.S. Cl. 357—22 **12 Claims**

1. A pressurized contact type double gate static induction thyristor comprising:

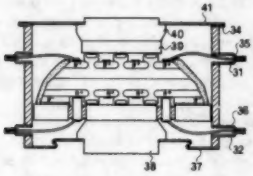
a casing;

a semiconductor body located in the casing and having cathode electrodes and a first gate electrode at one principal surface side thereof and anode electrodes and a second gate electrode at the other principal surface side thereof;

a first thermal expansion stress buffer plate located in the casing to be in contact with the cathode electrodes; and

a second thermal expansion stress buffer plate located in the casing and composed of at least two metal members electrically insulated from each other and integrally bonded

by an insulating material, one of the two metal members being in contact with the anode electrodes and the other



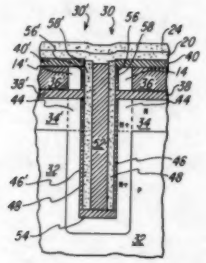
metal member being in contact with the second gate electrode.

4,673,962

VERTICAL DRAM CELL AND METHOD

Pallab K. Chatterjee, Richardson, and Ashwin H. Shah, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 21, 1985, Ser. No. 714,589
Int. Cl.[4] H01L *29/78, 27/02, 29/06*
U.S. Cl. 357—23.6 **11 Claims**



1. A memory cell comprising:
a substrate having a trench formed therein;
an insulating layer formed on one sidewall of said trench;
a semiconductive layer formed on said insulating layer, said semiconductive layer including a drain region, a source region, and a channel region disposed between said source and drain regions;
a gate adjacent to said insulating layer in the region of said insulating layer adjacent to said channel region; and
a heavily doped region formed in said substrate adjacent to said the portion of said insulating layer which is adjacent to said source region, said heavily doped region having a conductivity type opposite that of said substrate.

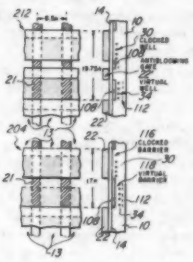
4,673,963

HIGH WELL CAPACITY CCD IMAGER

Jaroslav Hynecek, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 27, 1985, Ser. No. 770,323
Int. Cl.[4] H01L *29/78;* **G11C** *19/28*
U.S. Cl. 357—24 **2 Claims**

1. A charge coupled device (CCD) comprising:
a substrate having a p-type crystalline semiconductor upper portion containing a plurality of CCD elements connected in series, each said CCD element comprising a clocked phase portion and a direct current (DC) portion,
each of said clocked phase portions and each of said DC phase portions including both a well region and a barrier region,
said well regions of said DC phase portions comprising an n-type channel region,
and a p-type capacitance-enhancing region selectively located under said well regions of said DC phase portions, and not under said clocked phase portions, having a higher doping concentration than said semiconductor upper portion,



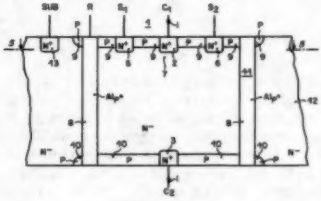
whereby said clocked phase portion can be clocked both positively and negatively with respect to a ground potential.

4,673,964

BURIED HALL ELEMENT

Radivoje Popovic; Katalin Solt, both of Zug, and Jean-Luc Berchier, Menzingen, all of Switzerland, assignors to LGZ Landis and Gyr Zug AG, both of Zug, Switzerland

Filed Dec. 18, 1985, Ser. No. 810,929
Claims priority, application Switzerland, May 22, 1985, 176/85
Int. Cl.[4] H01L *27/22*
U.S. Cl. 357—27 **19 Claims**



1. An electronic device comprising a first Hall element, said first Hall element comprising
a substrate including a first semiconductor material and having top and bottom major surfaces;
a top zone of a second semiconductor material having a conductivity of a first type defined in said substrate and including the top major surface of said substrate;
a bottom zone of a third semiconductor material having a conductivity of the first type defined in said substrate and spaced apart from said top zone;
first and second sensor connection contacts at the top major surface of said substrate and extending therefrom into a first portion of said substrate between said top and bottom zones;
a first current connection contact at the major top surface of said substrate and extending therefrom into the first portion of said substrate between said top and bottom zones;
a second current connection contact at one of the major surfaces of said substrate in one of said top and bottom zones and extending therefrom into the first portion of said substrate between said top and bottom zones;
said first and second sensor connecting contacts and said first and second current connection contacts being interre-

lated so that a first current source connected to said first and second current connection contacts in the presence of a first magnetic field component substantially parallel to the top major surface of said substrate produces a first Hall voltage between said first and second sensor connection contacts and a first part of said substrate between said top and bottom zones primarily involved in producing the first Hall voltage defines a first active zone between said top and bottom zones;

said first active zone having a conductivity of a second type opposite to the conductivity of the first type;

a first annular zone of a fourth semiconductor material having a conductivity type of the first type defined in said substrate surrounding said first active zone and extending between said top and bottom zones, said first annular zone being strongly doped with aluminum impurity atoms; and

an electrical connection in electrical contact with said first annular zone;

said first annular zone being an electrical contact with said top and bottom zones, and said first and second sensor connection contacts and said first and second current connection contacts being in electrical contact with said first active zone.

4,673,965

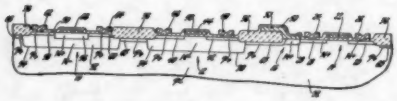
USES FOR BURIED CONTACTS IN INTEGRATED CIRCUITS

Randy A. Rusch, Kokomo, Ind., assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 468,149, Feb. 22, 1983. This application Nov. 5, 1984, Ser. No. 668,195

Int. Cl.[4] H01L *29/72, 29/54, 27/10, 29/08*

U.S. Cl. 357—43 **4 Claims**



1. In a monolithic integrated circuit having insulated gate field effect transistors (IGFETs) and a polycrystalline silicon buried contact on at least one region of one of the IGFETs, the improvement wherein the integrated circuit also includes an additional device area having a polycrystalline silicon buried contact thereon that forms part of an additional type of electrical device other than an IGFET, the additional device area that is divided by said polycrystalline silicon buried contact into at least two discrete parts, at least one region in each discrete part that contains the same dopant in the same dopant concentration profile through the thickness of the region as is contained in source and drain regions in one of said IGFETs, and discrete electrical contacts of the same material layer on all of said regions for electrically biasing said regions, whereby the regions in said additional device area and their separating buried contact cooperate to form a type of electrical component in the integrated circuit that is in addition to and different from said IGFETs.

4,673,966

SEMICONDUCTOR INTEGRATED CIRCUIT

Hiroyoshi Shimoyama, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 11, 1984, Ser. No. 599,065

Claims priority, application Japan, Apr. 26, 1983, 58-74301

Int. Cl.[4] H01L *23/48, 23/52, 25/04*

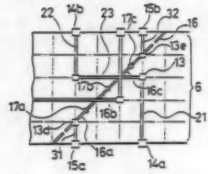
U.S. Cl. 357—68 **47 Claims**

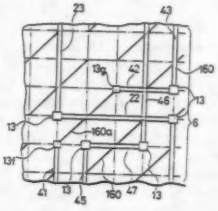
1. A semiconductor integrated circuit formed on a substrate comprising:

a plurality of circuit cells, each of said circuit cells having a plurality of wiring terminals;

a wiring region disposed between said circuit cells, said wiring region having first and second substantially parallel edges, each said edge being juxtaposed with a said circuit cell, said wiring region being divided into a plurality of rectangular frame portions by a reference field, said reference field including a plurality of first lines, said first lines being substantially parallel to said first and second parallel edges and being equispaced apart, said reference field also including a plurality of second lines, said second lines being equispaced and orthogonally disposed with respect to said first lines, said first and second lines intersecting at a plurality of intersection points, said reference field including a plurality of diagonal lines bisecting said rectangular frame portions, said diagonal lines passing through said intersection points, said diagonal lines being equispaced and parallel;

a first layer of wirings, said first layer of wirings comprising a plurality of diagonal wiring portions, a set of diagonal wiring portions being disposed along each of said diagonal lines, with adjacent colinear diagonal wiring portions in each set of diagonal wiring portions having equal distance gaps therebetween;





gap connector means disposed in selected ones of said equal distance gaps for creating diagonal wirings of varying lengths from said diagonal wiring portions;

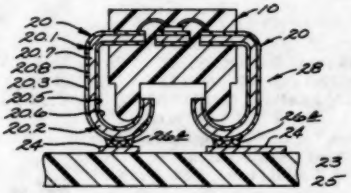
a first insulating layer disposed atop said first layer of wirings; and

rectangular wiring means, disposed on said first insulating layer, for electrically interconnecting said circuit cells through said first layer of wirings, said rectangular wiring means including a first plurality of wirings substantially aligned with selected ones of said first lines and further including a second plurality of wirings substantially aligned with selected ones of said second lines, said first plurality of wirings, said second plurality of wirings and said diagonal wirings of varying lengths providing electrical connections between said plurality of wiring terminals of said circuit cells, said diagonal wirings of varying lengths being connectable to said rectangular wiring means via through holes disposed in said first insulating layer.

4,673,967
SURFACE MOUNTED SYSTEM FOR LEADED SEMICONDUCTOR DEVICES

Premkumar Hingorany, Foxboro, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 29, 1985, Ser. No. 696,125
Int. Cl.[4] H01L 23/48
U.S. Cl. 357—70 7 Claims

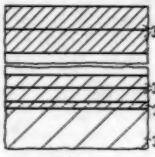


1. A semiconductor device having a semiconductor element mounted on an electrically insulating body and having at least one J-shaped lead electrically connected to the element and extending from the body so that a first lead leg depends from the body and a second lead leg extends from the distal end of the first leg, the second leg having a curved configuration with a convexly curved outer leg surface, characterized in that the second leg has a curved inner surface and the lead comprises a composite metal laminate material having a base metal layer portion embodying a springy metal material of selected electrical conductivity and solder wettability having a layer of metal of relatively lower solder wettability metallurgically bonded to the base metal layer portion disposed on the curved inner surface of the second J-shaped lead leg to avoid drawing up of solder onto the curved inner surface of the second lead leg during soldering of the lead so that the curved outer leg surface of the second lead leg is adapted to be securely soldered to a selected portion of a printed circuit for making an electrical connection to the circuit while tending to retain solder used in such connection between the curved outer surface of the second lead leg and the selected printed circuit portion.

4,673,968
INTEGRATED MOS TRANSISTORS HAVING A GATE METALLIZATION COMPOSED OF TANTALUM OR NIOBIUM OR THEIR SILICIDES

Konrad Hieber, Bernau, and Franz Neppl, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed May 27, 1986, Ser. No. 866,951
Claims priority, application Fed. Rep. of Germany, Jul. 2, 1985, 3523648
Int. Cl.[4] H01L 23/48, 29/78
U.S. Cl. 357—71 5 Claims

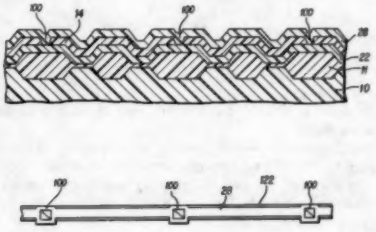


1. An integrated MOS transistor comprising:
a silicon substrate,
a gate oxide layer overlying said substrate, and
a gate metallization over said gate oxide layer including a tantalum or niobium metal or a tantalum or niobium silicide,
said gate metallization including an intermediate layer of an oxygen doped metal or metal silicide layer having a thickness of from 1/20 to 1/5 of the overall thickness of the gate metallization.

4,673,969
SEMICONDUCTOR DEVICE HAVING MULTIPLE CONDUCTIVE LAYERS AND THE METHOD OF MANUFACTURING THE SEMICONDUCTOR DEVICE

Shoji Ariizumi, and Makoto Segawa, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 639,619, Aug. 10, 1984, which is a continuation of Ser. No. 302,122, Sep. 14, 1981. This application Dec. 30, 1985, Ser. No. 814,295
Claims priority, application Japan, Sep. 22, 1980, 55-132146; Sep. 22, 1980, 55-132147
Int. Cl.[4] H01L 23/48
U.S. Cl. 357—71 5 Claims



4. A semiconductor device including a plurality of MOS transistors formed on a substrate, comprising:
a first insulation layer formed on the substrate including gate insulation layers of the MOS transistors and a field insulation layer, said field insulation layer having a greater thickness than said gate insulation layer;
a first conductive layer made of poly-Si formed on the first insulation layer and operating as gate electrodes of the MOS transistors;
a second insulation layer formed on the first conductive layer; and
a second conductive layer formed of poly-Si formed on the second insulation layer;
wherein the second conductive layer includes one region having high conductivity and an other region having low conductivity, and the one region is parallel connected to the first conductive layer directly through at least three contact holes in the second insulation layer and is formed narrower than the first conductive layer, and the other region is used as a resistive means.

4,673,970
CHROMINANCE SIGNAL PROCESSING SYSTEM

Tokikazu Matsumoto, Osaka; Yukio Nakagawa, Moriguchi, and Shinich Uchiyama, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 6, 1985, Ser. No. 741,889
Claims priority, application Japan, Jun. 8, 1984, 59-118513; Jun. 29, 1984, 59-135633
Int. Cl.[4] H04N 9/71, 9/68
U.S. Cl. 358—27 2 Claims

1. A chrominance signal processing system comprising:
a variable gain amplifier capable of effecting gain control for amplifying a carrier chrominance signal;
an A/D converter for effecting an analog/digital conversion of an output of said variable gain amplifier;
a demodulator for demodulating an output of said A/D converter into two chrominance difference signals on two demodulation axes which are apart by 90 degrees from

each other, one of said two chrominance difference signals being disposed at a right angle with respect to a vector of a burst signal of said carrier chrominance signal, wherein the number of bits of the two chrominance difference signals are so constituted that the number of bits of said one chrominance difference signal disposed at right angles with respect to the burst signal vector is smaller than the number of bits of the other of said two chrominance difference signals;

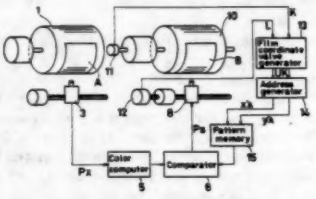
a computing circuit for computing an amplitude of the burst signal from said two chrominance difference signals; and a control circuit for producing a signal for controlling the gain of said variable gain amplifier from the output of said computing circuit.

4,673,971

HALFTONE DOT FORMATION

Kunio Ikuta, Nagaokakyo, and Katsunori Yamada, Kyoto, both of Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed Dec. 5, 1985, Ser. No. 804,931
Claims priority, application Japan, Jul. 12, 1984, 59-260121
Int. Cl.[4] H04N *1/46*
U.S. Cl. 358—75 **11 Claims**



1. A method of forming a halftone dot image on a photosensitive film by means of a recording beam controlled by a signal obtained by comparing an image signal obtained from an original with a corresponding threshold value signal read out from a screen memory in which an imaginary screen of a certain screen angle and screen ruling is stored, comprising the steps of:

(a) obtaining a film coordinate value corresponding to a recording pixel;

(b) obtaining a screen coordinate value of a certain screen angle corresponding to each recording pixel and a screen coordinate value of the same screen angle corresponding to a unit halftone dot area composed of a certain number of recording pixels arranged in a matrix in main and sub-scanning directions according to the said film coordinate value;

(c) generating random numbers to be imposed on the screen coordinate value of the unit halftone dot area according to the screen coordinate value thereof;

(d) obtaining main and sub-scanning reading addresses of the screen memory respectively by summing the main scanning direction random number and the main scanning direction coordinate value of the corresponding recording pixel and by summing the sub-scanning direction random number and the sub-scanning direction coordinate value of the corresponding recording pixel; and

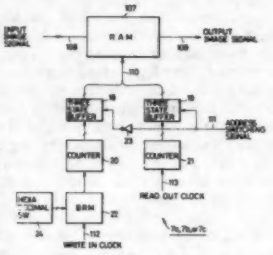
(e) reading out a threshold value corresponding to the summed values of both the directions from the screen memory.

4,673,972

COLOR IMAGE PROCESSING APPARATUS IN WHICH DIFFERENT COLOR SIGNALS OF DIFFERENT COLORS ARE READ INTO DIFFERENT MEMORIES AT DIFFERENT RATES

Yoshikazu Yokomizo, Kawagoe, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 5, 1984, Ser. No. 586,068
Claims priority, application Japan, Mar. 8, 1983, 58-38028
Int. Cl.[4] H04N *1/46, 1/04, 1/21*
U.S. Cl. 358—77 **7 Claims**



5. A color image processing apparatus comprising:

color image data generation means for generating color image data for a plurality of different colors;

a plurality of memory means each for storing the color image data for one color;

writing means for writing the color image data into each of said memory means;

readout means for reading out the color image data stored in each of said memory means; and

control means for independently controlling the writing speed of said writing means for writing the color image data for each color into respective ones of said memory means.

4,673,973

SPLIT-IMAGE, MULTI-POWER MICROSCOPIC IMAGE DISPLAY SYSTEM AND METHOD

Robert S. Ledley, Silver Spring, Md., assignor to National Biomedical Research Foundation, Washington, D.C.

Filed Feb. 4, 1985, Ser. No. 697,930
Int. Cl.[4] H04N *7/18*
U.S. Cl. 358—93 **19 Claims**

1. A method for displaying magnified images of an object having different respective magnifications, comprising:

providing an objective, characterized by a given magnification, through which the image of the object passes to produce an objective optical output having the given magnification;

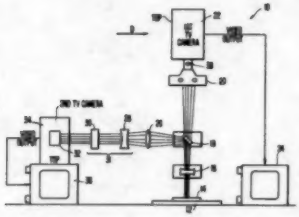
splitting the objective optical output into first and second optical outputs for passage through respective first and second optical paths;

providing said first optical output to a first camera in said first optical path, said first camera producing a first video output;

bending said second optical output to direct it toward a second camera in said second optical path, said second camera producing a second video output; and

processing said first and second video outputs to display first and second images, respectively, of the object;

wherein the method comprises the further step of adjusting the magnification of at least one of the first optical output



in said first optical path and the second optical output in said second optical path so that the magnification of the object in the first path differs from the magnification of the object in the second optical path;

whereby to display the first and second images of the object magnified in accordance with the different respective magnifications.

4,673,974

IMAGE TRANSMISSION SYSTEM

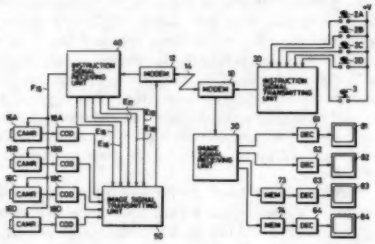
Tetsuo Ito; Setsuo Arita, and Wataru Kitaura, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 7, 1986, Ser. No. 816,841

Claims priority, application Japan, Jan. 18, 1985, 60-5743

Int. Cl.[4] H04N 7/18; G08B 1/08

U.S. Cl. 358—108 **4 Claims**



1. An imagery data transmission system for transmitting, over a transmission link, imagery data from a plurality of remote sites, whereat television cameras for monitoring conditions at said sites are located, to a monitoring site for display on a display monitor thereat, the frequency bandwidth of said transmission link being divided into a plurality of transmission channels, comprising:

at said monitoring site,

first means, coupled to said transmission link, for transmitting instruction signals for controlling the transmission of imagery data from said remote sites, said instruction signals containing a plurality of codes each of which is selectively assignable to the cameras of said remote sites, said plurality of codes including a first group of codes assigned to respective ones of said cameras for causing imagery data obtained thereby to be transmitted as full motion imagery data and a second group of codes assigned to respective others of said cameras for causing imagery data obtained thereby to be transmitted as frame repetition imagery data; and

second means, coupled to said transmission link, for receiving imagery data transmitted from said remote sites and coupling imagery data that has been transmitted as full motion imagery data to respective display monitors for full motion display thereof and for coupling imagery data that has been transmitted as frame repetition imagery data to respective display monitors for displaying thereon frame repetition imagery data; and

at each of said remote sites,

third means, coupled to said transmission link, for decoding said instruction signals and producing control signals for controlling the transmission of imagery data, derived from cameras thereat, as full motion imagery data or frame repetition imagery data; and

fourth means, coupled to said third means and said transmission link, for receiving imagery data generated by said television cameras and transmitting said imagery data over said transmission link as full motion imagery data or frame repetition imagery data in accordance with the control signals produced by said third means, said fourth means including a plurality of first imaging data storage means for storing imagery data derived from respective cameras associated with said first group of codes, and second imagery data storage means for storing, in a timed-shared manner, imagery data derived from respective cameras associated with said second group of codes, and for causing the full motion imagery data stored by said plurality of first imagery data storage means to be transmitted over one of said plurality of transmission channels to said monitoring site and for causing the frame repetition imagery data stored by said second imagery data storage means to be transmitted over the remaining transmission channels in a time division multiplexed format to said monitoring site.

4,673,975

TELEVISION SIGNAL SCRAMBLING APPARATUS

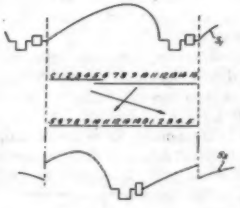
Masao Inaba, and Kazuo Kashigi, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Nov. 8, 1984, Ser. No. 669,820

Claims priority, application Japan, Nov. 9, 1983, 58-210349

Int. Cl.[4] H04N 7/167, 1/00, 7/16

U.S. Cl. 380—14 **11 Claims**



1. An apparatus for scrambling a television signal, comprising:

means for dividing each horizontal line including a sync signal thereof of said television signal into two parts at a segment point located on said horizontal line;

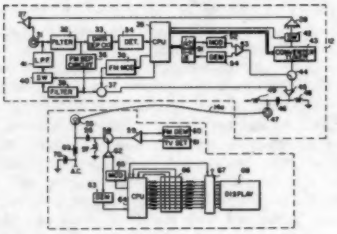
means for exchanging said two parts, said exchanging means including means for transmitting said segment point at the leading and trailing edges of a scrambled horizontal line; and

means for changing the location of said segment point in each consecutive horizontal line whereby the intervals between the horizontal sync signals in the scrambled television signal vary irregularly in accordance with the location of said segment point.

4,673,976
CABLE TELEVISION SYSTEM DATA VERIFICATION APPARATUS

David Wreford-Howard, Englewood, Colo., assignor to American Television & Communications Corporation, Englewood, Colo.

Filed May 31, 1984, Ser. No. 615,778
Int. Cl.[4] H04N 7/167; H04J 1/16; H04L 5/14
U.S. Cl. 358—10 7 Claims

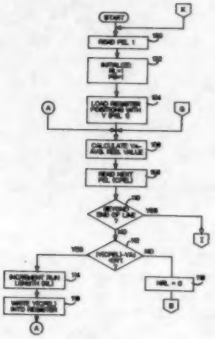


1. A data transmission line diagnostic device comprising:
a transmission line;
a first electronic device for receiving manually entered input data, said first electronic device being connected to one end of said transmission line;
a second electronic device connected to another end of said transmission line;
first data processing means located in said first electronic device for receiving said manually entered input data and for generating data corresponding to said manually entered data;
first modulating means located in said first electronic device for modulating the data from said first data processing means and for transmitting modulated data to said second electronic device through said transmission line;
first demodulating means located in said second electronic device for demodulating the modulated data from said first modulating means and converting the demodulated data to digital data;
second data processing means for receiving the digital data from said first demodulating means and for generating echo back data having the same content as that of the digital data;
second modulating means for modulating the echo back data from said second data processing means and for transmitting modulated echo back data to said first electronic device through said transmission line;
second demodulating means located in said first electronic device for demodulating the modulated echo back data from said second modulating means and for reproducing the echo back data;
verification means located in said first data processing means for comparing the demodulated echo back data from said second demodulating means with the manually entered input data and for visually displaying the echo back data; and
means for visually displaying error display data when a noncoincidence between the demodulated echo back data and the manually entered input data is detected by said verification means, for alerting a user to defects in said transmission line and for indicating a need for transmission line maintenance.

4,673,977
METHOD OF SPATIALLY THRESHOLDING A DISCRETE COLOR IMAGE

William K. Stelzenmuller, Morrisville, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 20, 1985, Ser. No. 747,094
Int. Cl.[4] H04N 7/12, 1/00; G06K 9/36
U.S. Cl. 358—133 8 Claims



1. A method of processing a line of image data resulting from the sampling of an NTSC composite color video signal and the subsequent decomposition of resulting pels into luminance and chrominance components, said method comprising the steps of:
establishing a run of pels by comparing the luminance of a given pel with an intermediate average luminance based on the actual luminances of preceding pels, said run ending at that pel having a luminance which differs from the intermediate average luminance by more than a predetermined absolute limit;
assigning a final luminance value for an established run as a function of the actual luminances of pels within the run;
determining whether a transition region follows an established run by comparing the luminance of successive pels with the luminance of the immediately preceding pel, any said transition region including these pels beginning with the pel following an established run and ending at the first pel having a luminance which differs from the luminance of the preceding pel by less than a predetermined algebraic limit;
establishing a local threshold for any transition region as a function of the assigned final luminance value for the established run and the actual luminance of said first pel;
assigning either the final luminance value or the actual luminance of said first pel to all pels in the transition region as a function of the actual luminances for those pels relative to the local threshold; and
repeating the preceding steps until the last pel in the line is processed.

4,673,978
PROGRESSIVE SCAN PROCESSOR WITH PLURAL FREQUENCY BAND INTERPOLATION

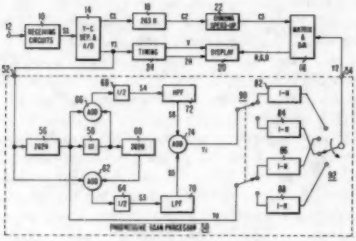
Robert A. Dischert, Burlington, N.J.; Robert J. Topper, Hatboro, Pa., and William M. Shyu, Edison, N.J., assignors to RCA Corporation, Princeton, N.J.

Filed May 23, 1986, Ser. No. 866,484
Int. Cl.[4] H04N 7/01
U.S. Cl. 358—140 5 Claims

1. A progressive scan processor, comprising:
a source responsive to a video input signal for providing a field delayed video signal, a frame averaged video signal and a line averaged video signal having picture elements

spatially and temporally coincident with corresponding picture elements of said frame averaged video signal;

circuit means for low pass filtering said frame averaged signal, for high pass filtering said line averaged signal and for combining the filtered signals to form an interpolated signal; and



speed-up means for time compressing said interpolated and field delayed signals and for interleaving the time compressed signals to form a video output signal of progressive scan form.

4,673,979

DIGITAL DATA REPRODUCING SYSTEM

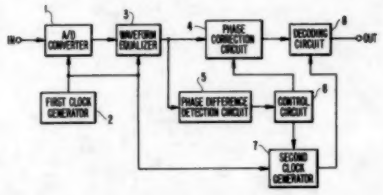
Kazuo Kobo, Neyagawa; Noriaki Morotomi, and Takeshi Sato, both of Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jun. 11, 1985, Ser. No. 743,366

Claims priority, application Japan, Jun. 15, 1984, 59-123008; Jul. 6, 1984, 59-140871; Aug. 27, 1984, 59-177710

Int. Cl.[4] H04N *7/087*

U.S. Cl. 358—142 **18 Claims**



1. A digital data reproducing system for reproducing digital data from a digital information signal which is transmitted from a remote transmitter at a transmission rate of f b.p.s., said system comprising:

a first clock generation means for generating a first clock of a frequency which is greater than f Hz;

a signal quantizing means for quantizing said digital information signal in synchronism with said first clock;

a waveform equalizing means for equalizing the waveform of the quantized signal;

a phase correction means for performing a phase shift correction on the waveform-equalized signal;

a phase difference detection means for producing from the waveform-equalized signal a phase difference signal corresponding to a phase difference between the phase of said first clock and an ideal sampling phase which is equal to the phase of a clock with which said digital information signal has been transmitted from said remote transmitter;

a control means responsive to said phase difference signal for producing a phase correction information signal and a second clock information signal, said phase correction information signal being supplied to said phase correction means for controlling said phase correction thereof;

a second clock generating means responsive to said first clock and said second clock information signal for generating a second clock; and

a decoding means for decoding an output of said phase corrction means in synchronism with said second clock into said digital data.

4,673,980

VIDEO-SIGNAL TIME-AXIS CORRECTION APPARATUS

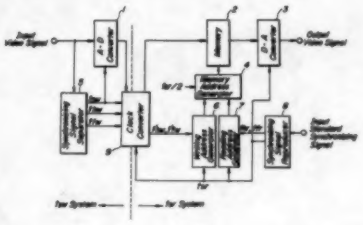
Keinosuke Murakami; Kazumasa Enami, and Nobuyuki Yagi, all of Tokyo, Japan, assignors to Nippon Hoso Kyokai, Japan

Filed May 22, 1986, Ser. No. 865,988

Claims priority, application Japan, May 24, 1985, 60-110120

Int. Cl.[4] H04N *5/073*

U.S. Cl. 358—149 **3 Claims**



1. A video-signal time-axis correction apparatus for converting an input time-axis based on an input video signal to a standard time-axis by changing an input clock signal indicating the input time-axis to a standard clock signal indicating the standard time-axis, comprising

an analog to digital converting means for converting an input analog video-signal to an input digital video-signal under the control of said input clock signal,

a synchronizing signal separating means for separating input synchronizing signals from said input analog video-signal and generating said input clock signal on the basis of said input synchronizing signals, a synchronizing signal reproducing means for generating said standard clock signal from standard synchronizing signals externally supplied on the basis of said standard time-axis,

a clock converting means for converting said input synchronizing signals derived from said synchronizing signal separating means to output synchronizing signals being in phase with said standard clock signal derived from said synchronizing signal reproducing means,

a memory means for memorizing said input digital video signal obtained in said analog to digital converting means,

a writing address generating means for generating writing addresses for controlling the writing of digits of said input digital video signal into said memory means under the control of said standard clock signal derived from said synchronizing signal reproducing means and said output synchronizing signals derived from said clock converting means,

a reading address generating means for generating reading addresses for controlling the reading of said digits from said memory means under the control of said standard clock signal and said standard synchronizing signals derived from said synchronizing signal reproducing means,

a memory address generating means for generating memory addresses for alternately controlling the writing and the reading of said digits in said memory means for alternately switching said writing addresses and said reading addresses at one half of the period of said standard clock signal, so as to convert said input digital video signal to an output digital video signal, and

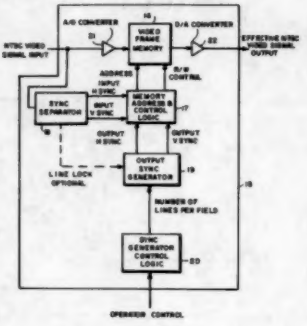
a digital to analog converting means for converting said output digital video-signal derived from said memory means to an output analog video signal based on said standard time-axis under the control of said standard clock

signal derived from said synchronizing signal reproducing means.

4,673,981
UNRECORDABLE VIDEO SIGNALS

Andrew B. Lippman, Salem; Victor M. Bove, Jr., Cambridge, and Jerome B. Wiesner, Watertown, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Mar. 23, 1984, Ser. No. 592,290
Int. Cl.[4] H04N 5/14
U.S. Cl. 358—160 **21 Claims**



1. A system for processing video signals comprising

means responsive to an input video signal having charactristics conforming to a selected standard for storing successive frames thereof;

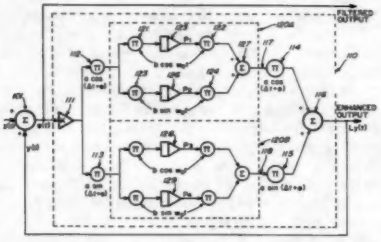
means for successively retrieving said stored video fames of said input video signal, said retrieving mean including

means for selectively altering the time bases of selected ones of said successively retrieved video frames to provide an output video signal effectively conforming to the same selected standard, the selected ones of said successive video frames thereof having said altered times bases, said altering means comprising synchronizing circuit means for controlling said time bases in a selected manner.

4,673,982
MULTIPLE FREQUENCY ADAPTIVE NOISE FILTER FOR REMOVING INTERFERENCE SIGNALS FROM A FREQUENCY BAND HAVING A DESIRED SIGNAL

Le Dinh C. Tam, Brossard; Roger Garceau, Pierrefonds, and Andre Leblanc, Laval; all of Canada, assignors to Centre de Recherche Industrielle du Quebec, Quebec, Canada

Filed Oct. 4, 1984, Ser. No. 657,525
Int. Cl.[4] H04N 5/21
U.S. Cl. 358—167 **12 Claims**

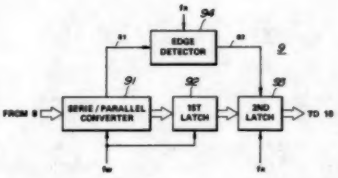


1. A multiple frequency adaptive filter system for filtering an input signal containing at least two sinusoidal interference signals contained in the same frequency band, said system comprising a negative feedback circuit having a narrow bandpass transfer function and generating an enhanced output signal corresponding to the interference signals contained in said input; said enhanced output signal being connected to an adder circuit at an input of said filter system where said input signal is combined with said enhanced output signal to produce an error signal feeding said negative feedback circuit, said error signal corresponds to the said input signal, said negative feedback circuit having a pair of multiplier circuits for conditioning said error signal in phase/quadrature, each of said multiplier circuits being connected to a respective conditioning circuit, and a combining circuit for adding the signals generated respectively by the conditioning circuits, said combining circuit generating said enhanced output signal, said conditioning circuit having at least a pair of demodulating means for demodulating the output signal of its associated multiplier circuit, each of said demodulating means being connected to a respective integration means to determine the amplitude of a respective demodulated signal at the output of said demodulating means, at least a pair of modulating means for modulating said demodulated signal at the output of said integration means, and adder means for adding said respective modulated signal at the output of said respective integration means from each said modulating means, said adder means feeding multiplier means, said multiplier means of each conditioning circuit feeding said combiner circuit to generate said enhanced signal.

4,673,983
PICTURE-IN-PICTURE TELEVISION RECEIVERS

Toshio Sarugaku, Chiba; Hisafumi Motoe, Kanagawa; Masaharu Tokuhara, Kanagawa, and Masayuki Hongu, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 6, 1986, Ser. No. 915,397
Claims priority, application Japan, Oct. 29, 1985, 60-242058
Int. Cl.[4] H04N 5/272, 5/262
U.S. Cl. 358—183 **4 Claims**



1. A picture-in-picture television receiver for reproducing two different pictures simultaneously on a common display screen, which comprises:

(a) analog-to-digital converter means responsive to an analog subpicture signal for outputting a digital subpicture signal;

(b) first latch circuit means for latching the digital subpicture signal in response to a subpicture clock signal fw in synchronism with a subpicture synchronizing signal;

(c) second latch circuit means for latching an output signal of said first latch circuit means in response to a main picture clock signal f_R in synchronism with a main picture synchronizing signal;

(d) memory means for storing an output signal of said second latch circuit means; and

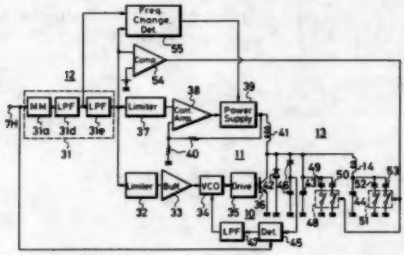
(e) read processing circuit means for reading the stored output signal of said second latch circuit means in synchronism with the main picture synchronizing signal to insert the read signal in a predetermined area of the main picture signal.

4,673,984

MULTIPLE SCANNING TYPE TELEVISION RECEIVER

Masafumi Kikuchi, Kanagawa, and Hiroshi Sakamoto, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 15, 1986, Ser. No. 852,362
Claims priority, application Japan, Apr. 19, 1985, 60-83659
Int. Cl.[4] H04N *3/18*
U.S. Cl. 358—190 8 Claims



1. A multiple scanning type television receiver of the type comprising:

a cathode ray tube;

video signal receiving means for receiving a video signal, a vertical synchronizing signal and a horizontal synchronizing signal;

a signal processing circuit for supplying said video signal to the cathode ray tube;

a vertical deflection circuit for supplying a vertical deflection signal to the cathode ray tube in response to said vertical synchronizing signal;

a horizontal deflection circuit having an output switching device for supplying a horizontal deflection signal to the cathode ray tube in response to said horizontal synchronizing signal;

frequency detecting means connected to said video signal receiving means for detecting the frequency of said horizontal synchronizing signal and deriving a control signal in response thereto; and

first control means connected between said frequency detecting means and said horizontal deflection circuit for controlling the latter in response to the first control signal from the former;

characterized by

a frequency change detector connected to said video signal receiving means for detecting a frequency change of said horizontal synchronizing signal;

a switchable power supply means for said horizontal output switching device; and

second control means connected between said frequency change detector means and said switchable power supply means for deactivating said power supply circuit during a transient period when the frequency of the horizontal synchronizing signal changes.

4,673,985

SEMICONDUCTOR IMAGE SENSOR

Jun-ichi Nishizawa, Sendai, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

PCT No. PCT/JP83/00303, § 371 Date May 9, 1984, § 102(e) Date May 9, 1984, PCT Pub. No. WO84/01076, PCT Pub. Date Mar. 15, 1984
PCT Filed Sep. 9, 1983, Ser. No. 610,283
Claims priority, application Japan, Sep. 9, 1982, 57-157693
Int. Cl.[4] H04N *3/12;* H01L *29/80*
U.S. Cl. 358—213.12 36 Claims

1. A semiconductor image sensor comprising

a semiconductor substrate,

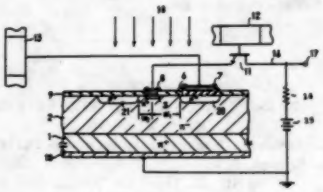
a matrix of pluralities of row and column lines formed over said substrate,

a static induction transistor located in the vicinity of each intersection of said row and column lines and connected respectively thereto, each said transistor serving as a photoconductive cell and a storage capacitor, each said transistor comprising

a first main electrode connected to a respective one of the column lines, and a second main electrode connected in common to the second main electrodes of the other static induction transistors,

a channel region defined in said substrate between said main electrodes and two control regions defined in said substrate at opposite sides of said first main electrode, a first one of said control regions being comprised in said photoconductive cell, and

a first terminal of said capacitor being connected to said first control region and a second terminal of said capacitor being connected to one of said row lines, and



the second of said control regions acting as a region for signal separation between adjacent ones of said photoconductive cells of said array,

wherein, in order to increase the sensitivity of said photoconductive cell to input light, the distance between said first control region and said first main electrode is larger than the distance between the second control region and said first main electrode,

a plurality of switching transistors each having a respective first electrode connected to a first end of a respective one of said column lines, and a respective second electrode connected in common to the second electrodes of the other switching transistors of the other columns,

a series connection of a readout video load resistor and a power source connected to said second electrodes of said switching transistors,

a video line selection circuit connected to a control electrode of each said switching transistor; and

a readout address circuit connected via the respective capacitor to the control gate of each said photoconductive cell.

4,673,986

IMAGE DISTORTION CORRECTION METHOD AND APPARATUS

Timothy A. Jenness, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

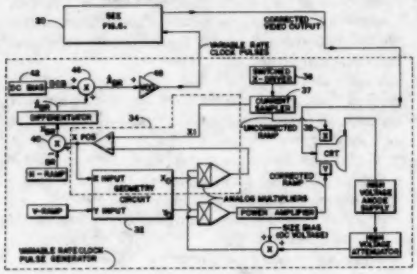
Continuation of Ser. No. 443,820, Nov. 23, 1982, abandoned. This application Nov. 4, 1985, Ser. No. 794,334
Int. Cl.[4] H04N *5/68*
U.S. Cl. 358—242 17 Claims

1. An apparatus for correcting video image distortion on a CRT display comprising:

first means for receiving video information at a first rate and for outputting said video information at a variable rate as a video output signal, said video output signal producing a corrected video image on said CRT display;

second means for generating a position predictable signal representative of the instantaneous position along an axis of the point of incidence of an electron beam on the face of said CRT display; and

third means for generating a variable rate clock signal as a function of the position predictable signal, said variable



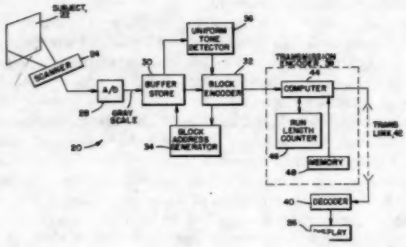
rate clock signal being input to said first means to produce said video output signal.

4,673,987

COMPRESSED BLOCK CODE FOR FACSIMILE TRANSMISSION

Kazuhara Toyokawa, Kanagawa, Japan, assignor to IBM Corporation, Armonk, N.Y.

Filed Apr. 22, 1985, Ser. No. 725,970
Int. Cl.[4] H04N *1/40*
U.S. Cl. 358—260 **9 Claims**



1. A process for encoding pictorial data of a subject for construction of an image thereof comprising:

scanning the subject to obtain gray-scale tone-level data of individual pels of the subject;

converting tone-level data of each subject pel to a digital word identifying the tone level;

coding the data of the subject pels with a block code having individual code words corresponding to the tone levels of respective ones of the subject pels, and wherein some of the blocks of the code correspond to standardized patterns having predetermined arrays of black and white pels which patterns represent various uniform tone levels of the subject pels, and other ones of the blocks provide patterns having a random array of black and white pels which follow detail of the subject;

identifying individual ones of the standardized patterns, and the random patterns, with suffixes appended to the code;

detecting a repetition of the standardized patterns which may occur during a scanning of the subject; and

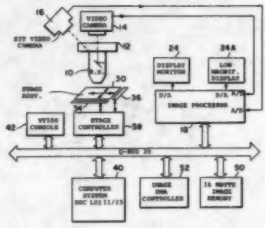
inserting a further component of the code in place of repeated entries of code words for the repeated patterns, said further component designating the number of such repetitions.

4,673,988

ELECTRONIC MOSAIC IMAGING PROCESS

Peter A. Jansson, Hockessin, Del.; Wade T. Rogers, West Chester, Pa., and James S. Schwaber, Wilmington, Del., assignors to E.I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 22, 1985, Ser. No. 725,636
Int. Cl.[4] H04N *1/40*
U.S. Cl. 358—280 **14 Claims**



1. Method for producing a single, high-resolution, wide-field-of-view electronic mosaic image of an object within an object plane by computer-controlled, multiple electronic image acquisition and assembly means, which method comprises the steps:

(a) selecting a field of interest within the object plane;

(b) defining the pixel size in the object plane;

(c) computing the number of image pixels in the y and y directions required to cover the field of interest in the object plane;

(d) determining the number of pixels in the x and y directions of each image segment;

(e) computing image segment size in the object plane;

(f) determining the position of each image segment in the object plane and the sequence in which the image segments will be acquired;

(g) positioning the object with respect to an image sensor so that the initial image segment position in the sequence lies on the image sensor optical axis;

(h) digitizing the field of view of the image sensor;

(i) transferring the digitized field of view to a set of locations which are contiguous in the x and y directions in a mosaic image storage means corresponding to the image segment position in the object plane;

(j) positioning the object with respect to the image sensor so that the next image segment position in the sequence lies on the image sensor optical axis;

(k) digitizing the field of view of the image sensor;

(l) transferring the digitized field of view to a set of locations which are contiguous in the x and y directions in the mosaic image storage means corresponding to the image segment position in the object plane, said correspondence being chosen such that the boundaries of adjacent image segments in the mosaic image storage means are in substantial abutment and alignment;

(m) repeating steps (j), (k), and (l) until all image segments in the sequence have been digitized and stored in the mosaic image storage means; and

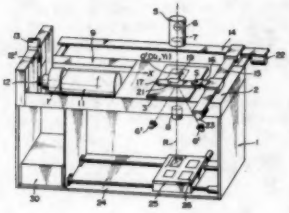
(n) recalling the resulting, single, high resolution, wide field of view mosaic image or any contiguous portion thereof from the mosaic image storage means.

4,673,989

METHOD AND APPARATUS FOR RECORDING PLURAL IMAGES WITH DESIRED LAYOUT BY AN IMAGE REPRODUCING SCANNER

Mitsuhiko Yamada, Kyoto, and Hideaki Kitamura, Osaka, both of Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Japan

Filed Dec. 11, 1985, Ser. No. 807,521
Claims priority, application Japan, Dec. 15, 1984, 59-264858; May 21, 1985, 60-106807
Int. Cl.[4] H04N *1/04*
U.S. Cl. 358—287 2 Claims



1. A method for recording plural images trimmed by basing on size and angle of a desired layout by an image reproducing scanner, characterized by comprising the following steps:

moving sequentially one or a plurality of frames on which each of said images to be reproduced relatively to an optical axis by maintaining a layout sheet which represents an area frames on a projecting plane of a projector on which the original picture images are to be projected;

mounting the original pictures to be reproduced on said projected area frames on an original picture holder which is movable and rotatable along a plane intersecting perpendicularly with the optical axis, and projecting said original picture images within the area frames on the layout sheet;

focusing the desired areas on which the original picture images are projected, by adjusting sizes and angles thereof according to magnification ratio of said projector and movement of said original picture holder, so that the desired areas may align to said area frames represented on the layout sheet;

loading the original pictures having been determined their positions and angles on a pick-up scanning drum of a scanner disposed on the coplane said original picture holder in maintaining the angles after having been transferred them thereto;

storing said magnification ratio of said projector, the positions of the original pictures, positions of said area frames on said layout sheet and amount of rotated angle from an origin position of said pick-up drum when the original pictures are loaded as a control data for said scanner;

repeating the above described steps for all original picture which are desired;

setting said pick-up scanning drum on which each of the original pictures are loaded; and

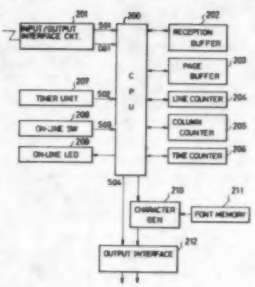
recording reproduced patterns by controlling said scanner according to said controlling data.

4,673,990

PRINTER HAVING CONTROL MEANS FOR STOPPING THE PRINTING OPERATION THEREOF AND INHIBITING DATA OUTPUT FROM MEMORY

Kunio Okada, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 19, 1985, Ser. No. 702,889
Claims priority, application Japan, Feb. 21, 1984, 59-29494
Int. Cl.[4] H04N *1/21, 1/23, 1/29*
U.S. Cl. 358—296 6 Claims



4. A printer comprising:

feed means for feeding a printing medium;

print means for printing on the printing medium fed by said feed means;

memory means for storing data and for supplying the data to said print means in blocks of one page at a time;

input means for inputting a temporary stop request to the printer; and

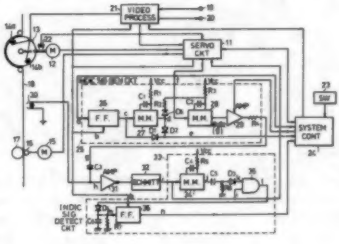
control means responsive to the temporary stop request during the printing operation for controlling the data access, wherein the control process relating to a stop request for data which is accessed during the printing process is different from a stop request for data which is accessed during the reading process.

4,673,991

VIDEO SIGNAL RECORDING AND/OR REPRODUCING APPARATUS HAVING A FUNCTION OF CARRYING OUT ASSEMBLED RECORDINGS

Yasuomi Namiki, and Satoshi Kawasaki, both of Yokohama, Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Feb. 21, 1985, Ser. No. 703,830
Claims priority, application Japan, Feb. 24, 1984, 59-34750
Int. Cl.[4] G11B *27/32;* H04N *5/782*
U.S. Cl. 360—14.1 6 Claims



1. A video signal recording and/or reproducing apparatus comprising:

video signal recording means for recording a video signal on a tape;

recording interrupting switch means for interrupting a recording when manually turned ON and for resuming the recording when manually turned OFF;

tape driving means for moving the tape in a forward direction during a recording mode, said tape driving means stopping the tape after moving the tape in a reverse direction for a predetermined distance responsive to an ON state of said recording interrupting switch means and moving the tape in the forward direction responsive to an OFF state of said recording interrupting switch means;

generating means for generating a joint indication signal for a predetermined time period when said recording interrupting means is turned ON and a recording interruption indication signal after said predetermined time period elapses;

joint indication signal recording and reproducing means for recording the joint indication signal from said generating means on the tape and for reproducing the joint indication signal from the tape when the tape moves in the forward direction after being moved in the reverse direction and stopped;

detecting means for producing a recording start command signal responsive to a detection of the joint indication signal reproduced by said joint indication signal recording and reproducing means; and

recording controlling means for interrupting a recording of the video signal on the tape responsive to the recording interruption indication signal from said generating means and for resuming a recording of another video signal on the tape responsive to the recording start command signal from said detecting means,

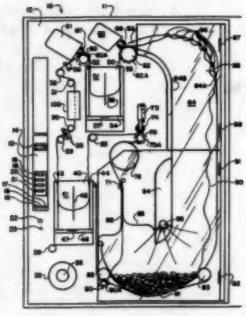
the tape being moved in the reverse direction for said predetermined distance and being stopped by said tape driving means in a state where said recording controlling means interrupts the recording of the video tape on the tape.

4,673,992

METHOD AND APPARATUS FOR INCREASING DENSITY OF AN ACCUMULATION OF TAPE IN A CLOSED LOOP TAPE TRANSPORTER

David W. Kincheloe, Graham, and Richard L. Clark, Burlington, both of N.C., assignors to American Multimedia, Inc., Burlington, N.C.

Filed Mar. 6, 1986, Ser. No. 836,991
Int. Cl.[4] G11B *5/86, 15/43, 15/70*
U.S. Cl. 360—15 **5 Claims**



1. In a closed loop, high-speed tape transporter of the type wherein a closed loop of recording tape is passed across a pick-up head where a signal on the loop of tape is conveyed downstream to at least one slaved duplicator, and wherein the loop of tape is conveyed from the pick-up head into a bin for accumulation and storage while a trailing length of the loop is passed across the pick-up head, and from the bin back across the pick-up heads repeatedly whereby successive replications of the signal from the loop are conveyed from the pick-up head to the slaved duplicator, the improvement which comprises an apparatus for increasing density of an accumulation of tape in the tape bin to permit greater tape capacity in the bin without damage to or tangling of the tape, said apparatus comprising:

(a) vacuum supply means; and

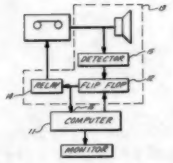
(b) a vacuum port communicating with the interior of the tape bin and operatively connected to said vacuum supply means, said vacuum port positioned to extract air from and lower the air pressure in the region of the bin occupied by the loops of accumulated tape and inside the loops of tape sufficient to cause the accumulated tape to compress into tighter loops which occupy less space in the tape bin.

4,673,993

METHOD FOR SYNCHRONIZING A TAPE RECORDER TO A COMPUTER UNDER PROGRAM CONTROL

Michael P. McCaughey, 1235 East River Oaks, Baton Rouge, La. 70815

Filed Jan. 9, 1986, Ser. No. 817,345
Int. Cl.[4] G11B *27/22, 31/00*
U.S. Cl. 360—79 **2 Claims**



1. A method for operationally synchronizing movement of a tape recorder with a program controlling a computer monitor, comprising the steps of:

(a) recording an audio tape in a manner such that segments of sound are separated by fixed lengths of silence which serve as predetermined events;

(b) playing back an audio tape on a tape player in conjunction with a monitor display under computer program control;

(c) detecting said lengths of silence;

(d) signaling said detection to a means for deactivating said tape player and inputting said detection to a memory means;

(e) deactivating said tape player after said lengths of silence; and

(f) activating said tape player under program control from a computer, inputting a signal from said computer to said memory means and inputting a signal from said memory means to said computer.

4,673,994

VIDEO CASSETTE RECORDER WITH CASSETTE VIEWING MECHANISM

Toshihiko Hida, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 24, 1985, Ser. No. 694,323
Claims priority, application Japan, Mar. 5, 1984, 59-42505; Mar. 23, 1984, 59-56748; Mar. 29, 1984, 59-62510
Int. Cl.[4] G11B *5/027, 15/66;* G03B *1/04*
U.S. Cl. 360—85 **19 Claims**

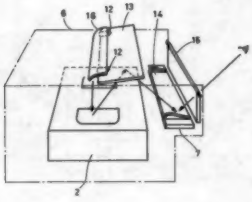
1. A video cassette recoder, comprising a VCR housing (1) having a mechanism for automatically loading a cassette tape

(2) into a deck (5) when said cassette tape (2) is simply inserted into an insetion opening (3) formed in said housing by moving said cassette tape along an insrtion path extending from the insertion opening to a receiving area, said video cassette recorder further comprising:

light emitting means (12, 16) disposed in said housing (1) for illuminating an upper surface of the cassette tape (2) loaded in the deck (5);

optical path changing means (13, 14) disposed in said housing (1) for transmitting an image of the cassette tape (2) illuminated by said light emitting means (12, 16) along a path which intersects the insertion path of the cassette and which extends towards said insertion opening (3); and

light transmitting means (15, 28) disposed at the insertion opening (3) in said housing (1) for enabling the image of the cassette tape (2) led by said optical path changing means (13, 14) to be seen therethrough from outside.



11. A video cassette recorder, comprising a VCR housing (1) having a mechanism for automatically loading a cassette tape (2) into a deck (5) when said cassette tape (2) is simply inserted into an insertion opening (3) formed in said housing, said video cassette recorder further comprising:

light emitting means (12) installed in said housing (1) for illuminating an upper surface of the cassette tape (2) loaded in the deck (5), and a first mirror (13) installed in said housing (1) and positioned above the cassette tape (2) loaded in the deck (5) so as to reflect the image of the cassette tape (2) illuminated by said light emitting means (12);

a movable lid (15) movably attached to said insertion opening (3) and capable of being seen through; and

a second mirror (14) installed below said movable lid (15) and adapted to reflect to the outside of said insertion opening (3) through the movable lid (15) the image of the cassette tape (2) reflected by said first mirror (13).

4,673,995

CARTRIDGE TAPE DRIVE WITH FRICTION ROLLER TO OPEN CARTRIDGE DOOR

Wolfgang Spiegelstein, Glendale, Calif., assignor to Kennedy Company, Monrovia, Calif.

Filed Jul. 6, 1984, Ser. No. 628,110
Int. Cl.[4] G11B *5/008, 15/00, 17/00*
U.S. Cl. 360—93 **11 Claims**

1. A tape drive for a digital magnetic cartridge of the type having a generally flat rectangular body and a tape access opening in the frontal edge of the body; said drive including:

a housing adapted to receive said cartridge by manual loading;

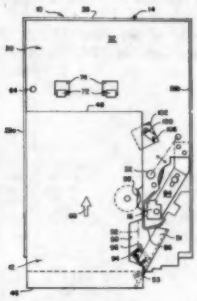
guide means defining a generally rectilinear loading path of travel within said housing for said cartridge;

a magnetic head mounted in said housing adjacent said path;

means for shifting said cartridge transversely of said loading path to and from said magnetic head when the cartridge is disposed within said housing whereby to present the tape access opening to the magnetic head,

said housing having a loading slot configured to permit only endwise loading of the cartridge into the housing, said cartridge having a hinged door normally covering said access opening,

said drive including means for opening said door as the cartridge is advanced along said loading path of travel, said opening means comprising a friction member disposed within said path of travel for intercepting said door as the cartridge is loaded into the housing,



said friction member comprising a roller rotatably supported within said path of travel,

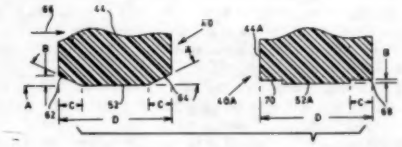
the axis of rotation of said roller being skewed relative to said path of travel.

4,673,996

MAGNETIC HEAD AIR BEARING SLIDER ASSEMBLY UTILIZING TRANSVERSE PRESSURIZATION CONTOURS

James W. White, 1816 Chicadee Dr., Knoxville, Tenn. 37919

Filed Apr. 29, 1985, Ser. No. 728,311
Int. Cl.[4] G11B *5/60*
U.S. Cl. 360—103 **20 Claims**



1. A slider assembly for supporting a magnetic transducer in relation to a moving magnetic record medium, comprising:

a support structure having leading and trailing edges relative to the motion of said medium, and a longitudinal axis disposed along the length of said support structure from said leading edge to said trialing edge;

at least one rail carried by said support structure defining a face toward said recording medium, said face being provided with a converging portion at said leading edge for pressurizing air between said face and said recording medium causing said slider assembly to fly at close proximity to said recording medium during moving of said recording medium; and

wherein said rail is provided with transverse pressurization contours along each side edge of said face for producing pressurization in one of said contours and expansion in the second of said contours when air flow across said face has a substantially undirectional transverse component, said transverse pressurization contours having an average angle with respect to said face of about 0.5 to about 2 degrees.

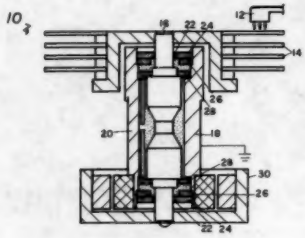
4,673,997
ELECTRICALLY CONDUCTIVE FERROFLUID BEARING AND SEAL APPARATUS AND LOW-VISCOSITY ELECTRICALLY CONDUCTIVE FERROFLUID USED THEREIN

Hanumaiah L. Gowda, Nashua; Kuldip Raj, Merrimack, and Lucian Borduz, Nashua, all of N.H., assignors to Ferrofluidics Corporation, Nashua, N.H.

Continuation-in-part of Ser. No. 713,757, Mar. 19, 1985, Pat. No. 4,604,229, and Ser. No. 736,338, May 21, 1985, Pat. No. 4,604,222. This application Sep. 9, 1985, Ser. No. 773,627

Int. Cl.[4] G11B *5/52, 21/04;* **E21B** *33/00;* **G01M** *27/82*

U.S. Cl. 360—107 **17 Claims**



1. A low-viscosity, electrically conductive ferrofluid composition for use in ferrofluid hydrodynamic bearing and seal apparatuses, which composition comprises:

(a) a liquid carrier;

(b) ferromagnetic particles in an amount sufficient to impart magnetic properties to the ferrofluid composition; and

(c) in combination finely-divided carbon particles and a cationic surfactant, the cationic surfactant present in an amount to provide for dispersion of the carbon particles and the magnetic particles in the liquid carrier, the carbon particles present in an amount of up to about 4% by weight of the ferrofluid composition and wherein the ratio of the magnetic particles to cationic surfactant ranges from about 0.5:1 to 20:1, to provide a low-viscosity, electrically conductive ferrofluid composition which has an electrical resistivity of about 10^2 ohms or less, and a viscosity of about 50 cps at 27° C. or less.

9. A ferrofluid bearing apparatus, which bearing apparatus comprises in combination:

(a) a housing characterized by a shaft-receiving cavity therein and having a one and another end, and having a radial-bearing, inner wall surface;

(b) a rotary shaft disposed for rotary movement within the shaft-receiving cavity, and defining with the cavity a radial-bearing cavity;

(c) thrust-bearing means to provide support for the longitudinal movement of the rotary shaft in the housing;

(d) a ferrofluid-seal-apparatus means at the one or the other or both ends of the shaft-receiving cavity, to provide a ferrofluid O-ring-type seal about the surface of the rotary shaft;

(e) an electrically conductive ferrofluid composition employed as the ferrofluid in the ferrofluid seal apparatus;

(f) a low-viscosity, electrically conductive ferrofluid composition in the bearing cavity, the ferrofluid composition comprising a liquid carrier, magnetic particles, and a cationic surfactant, wherein the ratio of the magnetic particles to cationic surfactant ranges from about 0.5:1 to 20:1, and having a viscosity of less than about 50 cps at 27° C. and a resistivity of about 10^2 ohms or less; and

(g) means to ground the bearing apparatus, thereby providing an electrically conductive bearing apparatus which conducts accumulated electrical charges from the shaft to the ground, without the need for a mechanical grounding button in contact with the shaft.

10. The bearing apparatus of claim 9 wherein the ferrofluid O-ring-type seal about the surface of the shaft element comprises an electrically conductive ferrofluid composition, and wherein the rotating shaft element and the housing are composed of electrically conductive materials.

4,673,998
MAGNETIC TRANSDUCER HEAD HAVING SERIES CONNECTED MAGNETRORESISTANCE EFFECT SENSING ELEMENT WITH HEAD OUTPUT CONNECTED BETWEEN THE SENSING ELEMENTS

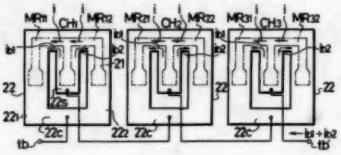
Yutaka Souda, Ebina; Shigeyoshi Imakoshi, Atsugi; Hideo Suyama, Yokohama; Hiroyuki Uchida; Yasuhiro Iida, both of Atsugi, and Tetsuo Sekiya, Yokohama, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 27, 1983, Ser. No. 546,060

Claims priority, application Japan, Oct. 29, 1982, 57-190181; Oct. 29, 1982, 57-190182; Oct. 29, 1982, 57-190186

Int. Cl.[4] G11B *5/127, 5/33;* **G01R** *33/02*

U.S. Cl. 360—113 **4 Claims**



1. A magnetic transducer head utilizing the magnetoresistance effect comprising:

series connected first and second magnetoresistance effect sensing elements arranged in a line configuration, both receiving a signal magnetic field derived from an common signal track on a magnetic recording medium, said series connected first and second magnetoresistance effect sensing elements each having a midregion near a midregion of the line configuration, said first magnetoresistance effect sensing element having a first end at one end of the line configuration, and said second magnetoresistance effect sensing element having a second end at an opposite end of the line configuration,

said first end of said first sensing element being connected to a first voltage, and said second end of said second sensing element being connected to a second voltage so as to cause flow sensing current through said first and second sensing elements, the respective midregions of said first and second sensing elements being connected in common to an output circuit,

bias conductor means having a first bias conductor portion continuous with a second bias conductor portion respectively disposed adjacent said first and second sensing elements' said first and second bias conductor portions each having a midregion generally in registry with the midregion of the line configuration, said first bias conductor portion having a first end generally in resistry with said one end of the line configuration, and said second bias conductor portion having a second end generally in registry with the opposite end of the line configuration, said bias conductor means applying a bias magnetic field of a first direction to said first sensing element and applying a bias magnetic field of a second direction to said second sensing element by applying bias current between the midregions of said first and second bias conductor portions and each of said first and second ends of said first and second bias conductor portions, such that upon the first and second magnetoresistance effect sensing elements receiving a common signal magnetic field, resistance of said first sensing element increases and resistance of said second sensing element decreases.

4,673,999

MULTI CHANNEL MAGNETIC TRANSDUCER HEAD

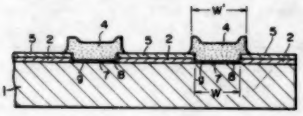
Hideo Suyama; Shigeyoshi Imakoshi; Yutaka Soda, all of Kanagawa; Takeyuki Fuse, Miyagi; Iwao Abe, Miyagi, and Noboru Wakabayashi, Miyagi, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 23, 1984, Ser. No. 643,544

Claims priority, application Japan, Aug. 29, 1983, 58-157650

Int. Cl.[4] G11B *5/127, 5/29*

U.S. Cl. 360—125 1 Claim



1. A multi channel magnetic transducer head comprising:

a magnetic substrate having a flat planar surface and a contact surface adjacent to and substantially perpendicular to said planar surface forming a contact surface for a traveling magnetic recording medium,

an insulating layer formed on said flat planar surface,

a plurality of magnetic cores formed over said insulating layer forming a plurality of closed magnetic paths with said magnetic substrate,

a plurality of conductors, each being coupled to each of said magnetic paths to form a plurality of magnetic transducer head elements,

said insulating layer having a plurality of gap portions ands spacing portions each aligned along said contact surface, said spacing portions being located between each of said gap portions,

said insulating layer at each of said gap portions having a first thickness corresponding to a gap length of each of said magnetic transducer head elements,

said insulating layer at each of said spacing portions having a second thickness larger than said first thickness, and

each of said magnetic cores being located on each of said gap portions and partly overlapping adjacent spacing portions so that the track width of each of said magnetic transducer heads is defined by the width of said gap portion facing said contact surface.

4,674,000

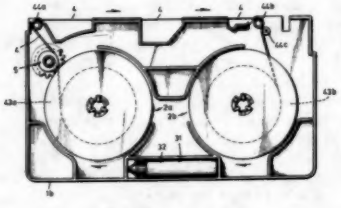
CLEANING DEVICE FOR THE MAGNETIC HEADS OF VIDEO TAPE RECORDERS

Jeen-Ju Lee, No. 4, Lane 605, Sec. 1, Ney Hwu Road, Taipei City, Taiwan

Filed Jul. 5, 1984, Ser. No. 628,041

Int. Cl.[4] G11B *23/08, 5/41*

U.S. Cl. 360—128 13 Claims



1. A cleaning device for cleaning a magnetic head of a video tape recorder, said video tape recorder including a loading chamber for accepting a cartridge containing a video tape to be played and a driving mechanism which causes said video tape to move across said magnetic head, comprising:

a cleaning cartridge housing which fits into said loading chamber;

two tape reels contained in said cleaning cartridge, said tape reels being rotated by said driving mechanism of said video tape recorder when said cartridge is inserted into said loading chamber and said driving mechanism is activated;

a cleaning tape wound on said tape reels;

a detergent storage unit rotatable mounted in the path of said cleaning tape, said detergent storage unit containing a cleaning felt for dispensing a detergent along a predetermined portion of the circumference of said detergent storage unit, wherein said cleaning felt presses against the outer surface of said cleaning tape and dispenses said detergent onto said cleaning tape; and

a detergent driving means mounted between said detergent storage unit and one of said tape reels, said detergent driving means rotating said detergent storage unit and said tape reel at a predetermined velocity ratio such that the outer circumferences of said detergent storage unit and said tape reel rotate at an approximately equivalent speed, wherein said cleaning tape is intermittently coated by said detergent when said tape reels are rotated by said driving mechanism, and wherein said coated cleaning tape contacts said magnetic head for cleaning.

4,674,001

CAM DRIVEN MODE SELECTION MECHANISM FOR TAPE RECORDER

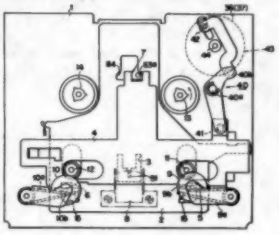
Akira Takahashi, Nagoya, and Isao Hasegawa, Saitama, both of Japan, assignors to Clarion Co., Ltd., Tokyo and Zero Engineering Ltd., Nagoya, both of, Japan

Filed Mar. 28, 1984, Ser. No. 594,092

Claims priority, application Japan, Mar. 31, 1983, 58-49157[U]

Int. Cl.[4] G11B *5/54, 15/02*

U.S. Cl. 360—137 16 Claims



1. A mode switching mechanism for a cassette tape recorder, comprising:

a drive motor;

a changeover plate and means supporting said changeover plate for reciprocal movement parallel to a first direction, said changeover plate being movable to first and second positions;

tape transport means for selectively drivingly coupling said drive motor to a tape cassette in said cassette tape player so as to effect movement of a tape therein in one of two directions which are opposite in response to movement of said changeover plate to said first and second positions, respectively;

a power plate and means supporting said power plate for movement parallel to a second direction different from said first direction;

a mode plate and means supporting said mode plate for reciprocal movement parallel to said second direction synchronously with said power plate, and for reciprocal movement parallel to said first direction independently of said power plate between several positions which corre-

spond to respective operational modes of said cassette tape recorder;

a rotatably supported mode cam;

first means for selectively drivingly coupling said motor to said mode cam for effecting rotation of said mode cam;

second means responsive to movement of said mode cam for moving said changeover plate and said mode plate to positions thereof corresponding to a selected operational mode;

a rotatably supported power cam;

third means for selectively drivingly coupling said drive motor to said power cam so as to effect rotation of said power cam and for interrupting said driving coupling from said motor to said power cam after said power cam has been rotated through a predetermined angle; and

fourth means responsive to rotation of said power cam through said predetermined angle for moving said power plate and said mode plate through a predetermined stroke in said second direction;

wherein said first means includes a mode solenoid which, when energized, allows said mode cam to rotate and, when deenergized, stops rotation of said mode cam; and

wherein said third means includes a pivotally-supported operation arm and a power solenoid, said operation arm normally being in a first position in which it holds said power cam against rotation but being moved in response to said mode solenoid being deenergized to a position in which it allows said power cam to be rotated, said power solenoid being energized after rotation of said power cam begins and holding said operation arm in a second position, said power solenoid being deenergized when the mode switching operation is complete to allow said operation arm to return to said first position in which it holds said power cam against rotation.

4,674,002

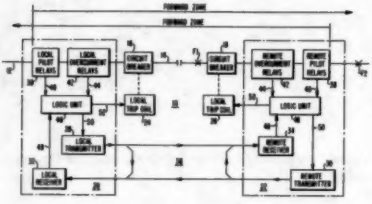
DIRECTIONAL COMPARISON BLOCKING SYSTEM

Hung J. Li, Coral Springs, Fla., and John D. McFall, Auburn Township, Geauga County, Ohio, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 8, 1986, Ser. No. 849,245

Int. Cl.[4] H02H *3/30*

U.S. Cl. 361—66 **18 Claims**



1. An echo-keyed directional comparison blocking system protecting an electrical power transmission path against internal faults, said transmission path including means for interrupting current at each end thereof, said system including a terminal unit disposed at each end of said transmission path for measuring characteristics representative of the power at its corresponding end of said path and for activating its corresponding interrupting means when an internal fault of the transmission path is detected, each terminal unit including a transmitter, and a receiver for communicating transmit and receive signals with each other through a communication medium, each receiver adapted to receive signals from the transmitters of the terminal units over said communication medium, each terminal unit comprising:

at least one forward-looking pilot relay coupled to said transmission path at its corresponding end and having its forward zone at least the length of said transmission path, said pilot relay operative to generate a first fault signal when it detects a fault within its forward zone;

at least one overcurrent relay coupled to said transmission path at its corresponding end for measuring the current of said path at its corresponding end and having a preset overcurrent threshold, said overcurrent relay operative to generate a second fault signal when said measured current exceeds said preset overcurrent threshold;

first circuit means governed by both of said first and second fault signals to supervise the fault detection of said transmission path and to generate a first signal representative of said supervised fault detection;

second circuit means governed by said first signal to key said transmitter for a reception time interval to transmit an initial signal to said other terminal unit over said communication medium;

third circuit means responsive to a receive signal from said other terminal unit to key said transmitter to transmit an echo signal to said other terminal unit over said communication medium; and

fourth circuit means governed by said first signal sustained beyond said reception time interval to generate a signal for operating said interrupting means, said operating signal generation being blocked in response to a received signal of said terminal unit.

4,674,003

ELECTRONIC HIGH-VOLTAGE GENERATOR FOR ELECTROSTATIC SPRAYER DEVICES

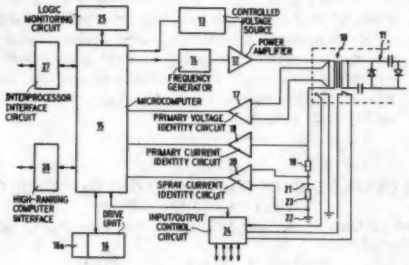
Hans-Joachim Zylka, Azmoos, Switzerland, assignor to J. Wagner AG, Switzerland

Filed Apr. 3, 1985, Ser. No. 719,466

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1984, 3416093

Int. Cl.[4] H02H *3/08*

U.S. Cl. 361—235 **9 Claims**



1. In combination, an electrostatic sprayer device, including actuation elements, and a high-voltage generator, comprising:

a charging electrode in said sprayer device;

a controllable low d.c. voltage source;

a frequency-clocked power amplifier connected to said low d.c. voltage source for converting the low d.c. voltage into a low a.c. voltage;

a transformer including a primary connected to said power amplifier, and a secondary, for transforming the low a.c. voltage into a medium a.c. voltage;

a high-voltage multiplier connected between said transformer and said electrode for converting the medium a.c. voltage into a high d.c. voltage, said multiplier mounted in said sprayer device;

a regulatable frequency generator connected to and operable to provide clock signals to said power amplifier;

a microcomputer including a plurality of data inputs, a plurality of control signal outputs and a stored control algorithm;

said controllable low d.c. voltage source and said frequency generator connnected to respective control signal outputs of said microcomputer and controlled in voltage and frequency, respectively, by said microcomputer to maintain the primary current of said transformer at a minimum for all respective voltages appearing at the output of said multiplier as reflected by control information; and

sensing means connected between said primary and said data inputs for continuously providing the control information as data input signals representing actual values of primary voltage and current,

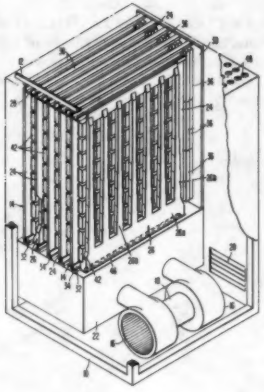
whereby said sprayer device is controlled and regulated for a constant electrical charging, independent of the load resulting from varying the distance between the sprayer device and a workpiece and independent of the material being sprayed.

4,674,004

PARALLEL-FLOW AIR SYSTEM FOR COOLING ELECTRONIC EQUIPMENT

Grant M. Smith, Bryn Athyn; Samuel R. Romania, Phoenixville, and Ronald T. Gibbs, King of Prussia, all of Pa., assignors to Burroughs Corporation, Detroit, Mich.

Filed Jul. 3, 1986, Ser. No. 881,725
Int. Cl.[4] H05K *7/20*
U.S. Cl. 361—384 **21 Claims**



14. A parallel-flow air system disposed in a cabinet, having a source of cooling air comprising:

at least one integral card-duct assembly, including a printed circuit card and an associated ducting structure, means for retaining said card and said ducting structure in fixed, parallel spaced-apart relationship,

said card having a plurality of integrated circuit package assemblies mounted thereon in a predetermined spaced-apart columnar relationship, said ducting structure including a plurality of finger-like ducts disposed in spatial correspondence with the columnar arrangement of said package assemblies, each of said ducts having a plurality of apertures homologously positioned with respect to said package assemblies,

means including said source of cooling air for causing air flow into said ducts and out of said apertures, thereby directing individual streams of cooling air simultaneously upon the respective package assemblies, and

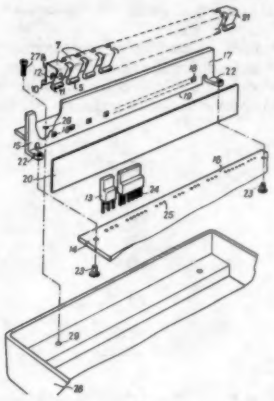
wherein each of said integrated circuit package assemblies includes a heat sink member affixed to an integrated circuit package, said heat sink member comprised of a frame, a pair of metallic corrugated sections mounted in said frame in spaced-apart fashion such that an opening is formed therebetween, each of said streams of cooling air emanating from said apertures being directed substantially toward the last mentioned opening in said heat sink member.

4,674,005

MULTIPLE FASTENING CLIP AND DEVICE FOR THE COLLECTIVE MOUNTING OF ELECTRONIC POWER COMPONENTS

Alexandre Lacz, Auterive, France, assignor to Bendix Electronics S.A., France

Filed Mar. 5, 1986, Ser. No. 836,280
Claims priority, application France, Mar. 7, 1985, 85 03351
Int. Cl.[4] H05K *7/20*
U.S. Cl. 361—388 **9 Claims**



1. A system for the simultaneous and collective mounting on a heat sink of electronic power components connected to a printed circuit, said system comprising:

a heat sink having a square angle section, provided with one face perforated by a row of apertures parallel to an edge of said angle section, and means for fastening said heat sink to the printed circuit;

a sheet of dielectric material of uniform thickness, placed against said perforated face of said heat sink; and

a multiple fastening substantially U-shaped resilient clip resiliently placed in position to embrace said perforated face of said heat sink, said dielectric sheet and the electronic power components, said clip having a plurality of projections along one side of said clip for snappingly engaging in said apertures in said heat sink for securing said clip to said heat sink.

4,674,006

CONTACT ARRAY ASSEMBLY FOR A COMPUTER-CONTROLLED PRINTED CIRCUIT BOARD TESTING APPARATUS

Hubert Driller, and Paul Mang, both of Schmitten, Fed. Rep. of Germany, assignors to MANIA Electronik Automatisation Entwicklung und Gerätebau GmbH, Schmitten, Fed. Rep. of Germany

Continuation of Ser. No. 669,307, Nov. 7, 1984, abandoned. This application Sep. 3, 1986, Ser. No. 903,835
Claims priority, application Fed. Rep. of Germany, Nov. 7, 1983, 3340180
Int. Cl.[4] H01B *1/02*
U.S. Cl. 361—393 **20 Claims**

1. In an assembly for use with a computer-controlled printed circuit board testing apparatus for determining whether the electrical connections of printed circuit boards to be tested

correspond to computer-memorized connections of a master printed circuit board, the testing apparatus being of the type including controlling computer logic, a plurality of contact members supported by the apparatus to be pressed by a printed circuit board to be tested such that electrical connections of the printed circuit board to be tested contact the contact members, the contact members being arranged within a grid-like array of equally sized segments, means for electrically connecting the contact members to the controlling computer logic, and means for absorbing the pressure of the printed circuit board to be tested being pressed against the contact members, the improvement wherein said assembly comprises:

a base plate to be supported in spaced relationship below the contact members of the testing apparatus;

said connecting means including a plurality of modules of identical construction extending upwardly from said base plate;

each said module including an upper connector having an outer contour defining a respective segment and defining therebelow a space limited by said outer contour, said upper connector having an arrangement of contacts to be

connected to the contact elements of the testing apparatus upon a printed circuit board to be tested being pressed thereon, and upper surfaces of said upper connectors defining a contact plane;

each said module including electronic components confined within the respective said space and connected to said contacts of the respective said upper connector; and

each said module including a lower connector means, located within the respective said space and connected to the respective said electronic components, for electrically connecting said respective electronic components to the controlling computer logic of the testing apparatus;

wherein said pressure absorbing means comprises, for each said module, at least one supporting rod connected to the respective said upper connector and extending downwardly through the respective said space and releasably supported by said base plate;

whereby said modules may be selectively relocated on said base plate and selected said modules may be removed from said assembly or additional modules may be added thereto, such that said assembly may be employed to test printed circuit boards of various different sizes and shapes.

4,674,007

METHOD AND APPARATUS FOR FACILITATING PRODUCTION OF ELECTRONIC CIRCUIT BOARDS

Barry J. Tragen, Forest Grove, Oreg., assignor to Microscience Corporation, Dunwoody, Ga.

Continuation-in-part of Ser. No. 742,448, Jun. 7, 1985, abandoned. This application Jul. 29, 1985, Ser. No. 760,264

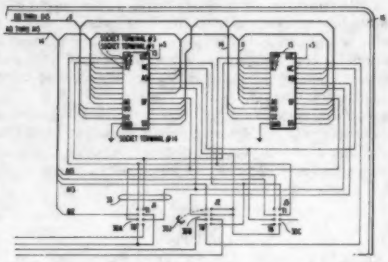
Int. Cl.[4] H01R *9/00*

U.S. Cl. 361—404 **3 Claims**

1. In a printed circuit board having a plurality of first integrated circuit chip sockets mounted on sets of socket terminals on said printed circuit board, and printed circuit wiring electrically connected to said socket terminals, respectively, in a predetermined pattern, the improvement comprising,

at least one redundant socket terminals therefor on said printed circuit board,

printed circuit wiring means connecting said set of redundant socket terminals in parallel to one set of said sets of



socket terminals so that in the event the integrated circuit chip for which said one of said first integrated circuit chip was designed is unavailable, a functionally equivalent integrated circuit chip can be received in said redundant integrated chip socket.

4,674,008

DISPLAY ELEMENT ATTACHMENT HOLDER

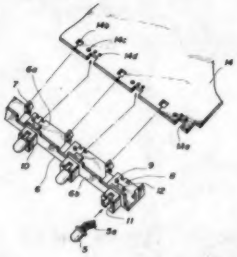
Minoru Oyama, and Ryoji Kinugawa, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Dec. 26, 1985, Ser. No. 813,648

Claims priority, application Japan, Dec. 25, 1984, 59-200035[U]

Int. Cl.[4] H05K *7/06*

U.S. Cl. 361—417 **3 Claims**



1. A display element attachment holder comprising:

a bottom plate portion;

a front plate portion formed uprightly from and integrally with said bottom plate portion such that said display element attachment holder is substantially L-shaped in cross-section; engagement-holding pawls upwardly formed on the upper surface of said bottom plate portion and spaced in the longitudinal direction of said bottom plate portion; and

display element attachment portions each shaped in the form of a rectangular pillar and integrally formed on said front plate portion, each of said display element attachment portions being formed between adjacent engagement-holding pawls and having a display element insertion portion;

said display element attachment holder being engaged with a substrate such that an end portion of the substrate is mounted on the upper surface of said bottom plate portion of said display element attachment holder with said engagement-holding pawls in pawl insertion holes formed in said substrate so that the display element attachment

holder is fixedly attached to the end portion of said substrate.

4,674,009

TANTALUM CAPACITOR LEAD WIRE

James Wong, Wayland, Mass., assignor to Supercon, Inc., Shrewsbury, Mass.

Continuation-in-part of Ser. No. 812,140, Dec. 23, 1985. This application Apr. 14, 1986, Ser. No. 851,343

Int. Cl.[4] H01G 9/00, 7/00

U.S. Cl. 361—433 2 Claims

1. A flexible elongated metallic structure suitable for providing a lead to a capacitor anode formed of sintered tantalum powder, said flexible structure comprising a tantalum wire having a cross-section less than 1 mm, said wire comprising a core of a metal other than tantalum and at least one discrete surface layer of tantalum surrounding said core, the tantalum layer having a radial thickness less than 0.3 mm, said core comprising mixed alternate layers of tantalum and niobium.

4,674,010

CAPACITIVE SUBMERGIBLE ELECTRICAL CONNECTOR APPARATUS

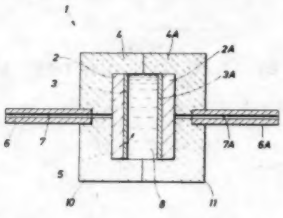
Leon van den Steen, Rijswijk, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 821,520, Jan. 23, 1986, abandoned, which is a continuation-in-part of Ser. No. 761,118, Jul. 31, 1985, abandoned. This application May 14, 1986, Ser. No. 862,926

Claims priority, application United Kingdom, Jan. 17, 1985, 8501155

Int. Cl.[4] H01G 9/00

U.S. Cl. 361—433 19 Claims



1. A capacitive electrical underwater connector apparatus, said connector apparatus comprising;

a first member,

a second member, each of said members including an electrode having a surface, each surface provideable with a dielectric layer, said electrodes electrically connectable to respective subsea installation parts to be capacitively coupled, said first and said second member mechanically mated to each other, said surface of said electrode of said first member located opposite and directed to said surface of said electrode of said second member, and

means for ensuring that a cavity defined through the space that separates said electrodes fills with sea water when submerged.

4,674,011

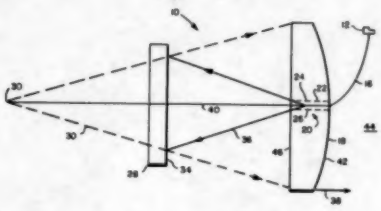
ALIGNMENT REFERENCE DEVICE

Gail Y. Patton, Sunnyvale, and Darrel D. Torgerson, Palo Alto, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sep. 10, 1986, Ser. No. 907,345

Int. Cl.[4] F21V 7/04, 29/00

U.S. Cl. 362—32 2 Claims



1. A collimated reference beam source, said source comprising:

a laser assembly, said laser assembly outputting a laser beam from a laser source;

an optical fiber assembly, said optical fiber assembly having therein a single mode optical fiber, said single mode optical fiber receiving said laser beam from said laser assembly, said optical fiber assembly having an optical fiber-to-lens assembly, said optical fiber passing through said fiber-to-lens assembly in a fixed manner;

a lens system, said lens system having said fiber-to-lens assembly fixedly attached thereto, said optical fiber passing through said fiber-to-lens assembly and terminating with an end acting as a source of laser energy, said end of said fiber being positioned on an optical axis of said lens system and at a nodal point of said lens system being a real focus point, said end of said optical fiber outputting a divergent laser beam; and

a mirror, said mirror being positioned one half focal length from said lens system, said mirror being perpendicular to said optical axis of said lens system whereby said divergent laser beam is reflected back into said lens system, said lens system outputting a collimated beam of laser energy having minimal angular divergence as a result of relative movement between said end of said optical fiber, said lens system, and said mirror.

4,674,012

DEVICE FOR FIXING AND ADJUSTING THE OPTICAL BLOCK OF A LAMP ON A MOTOR VEHICLE

Jose M. Ordonez Olmos, Mzrtos, Spain, assignor to Cibie Projecteurs, Bobigny, France

Filed Feb. 4, 1986, Ser. No. 826,124

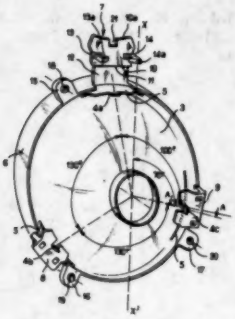
Claims priority, application France, Feb. 8, 1985, 85 01805

Int. Cl.[4] B60Q 1/04

U.S. Cl. 362—61 8 Claims

1. A device for fixing and adjusting an optical block on a motor vehicle, said optical block being of the type including a plurality of peripheral positioning tabs, said device comprising a one-piece support suitably shaped to co-operate with the peripheral edge of said optical block, said support being provided firstly with a plurality of mounting members enabling said support to be adjustably fixed to a vehicle, and secondly with a plurality of clamping members suitable for co-operating with said positioning tabs on said optical block in order to position said support and to hold said support relative to said optical block, each of said clamping members having a tongue hinged about a hinge on an outwardly-directed radially-extending fixed portion of said one-piece support and constituting an extension thereof, and each of said clamping members

further including an orifice suitable for imprisoning a corresponding one of said positioning tabs during a clamping operation performed by rotating said clamping member through 180° about said hinge, and fastening means for resiliently fixing



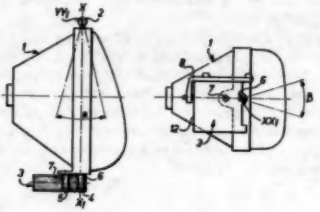
said clamping members to said fixed radially extending portion of said one-piece support, the relative positions of said mounting members and said clamping members ensuring that said optical block is correctly positioned on said vehicle.

4,674,013

DEVICE FOR ADJUSTING THE POSITION OF VEHICLE HEADLAMPS

Stéphane Manzoni, Saint Claude, France, assignor to Manzoni-Bouchot, France

Filed Jul. 10, 1985, Ser. No. 753,696
Claims priority, application France, Aug. 1, 1984, 84 12212
Int. Cl.[4] F21V *3/18*; B60Q *1/06*
U.S. Cl. 362—66 **12 Claims**



1. A device for adjusting the position in azimuth and in elevation of the headlamp for a vehicle having bodywork, said device comprising a support member adapted to be fixed on the bodywork, said headlamp having first and second ends, a horizontal and a swivel joint as one of the first and second ends by which the headlamp is mounted to the bodywork of the vehicle, two pins adjacent the other of the first and second ends of the headlamp, one of said two pins lying on the horizontal axis of the headlamp, the other of said two pins being offset with respect to the horizontal axis of the headlamp and generally parallel thereto, said device further comprising a mobile element which is adapted to pivotally receive said two pins of the headlamp, said mobile element being mounted to said support member to slide horizontally thereon, said device further comprising:

manual adjusting means for adjusting in azimuth said mobile element of said device relative to the bodywork of the vehicle, said manual adjusting means extending between said mobile element and the bodywork of the vehicle; and

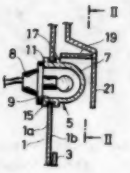
adjusting means for adjusting the headlamp in elevation by driving the other of said two pins and thereby the headlamp in an art about the horizontal axis, said adjusting means being selectively operable manually or automatically.

4,674,014

MOUNTING STRUCTURE FOR VEHICULAR LIGHTING UNIT

Kouichi Takatsuji, Zama, and Masaru Takasaki, Ebina, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Sep. 23, 1985, Ser. No. 779,105
Claims priority, application Japan, Sep. 28, 1984, 59-145796[U]; Sep. 28, 1984, 59-145797[U]
Int. Cl.[4] F21V *15/00*
U.S. Cl. 362—80 **8 Claims**



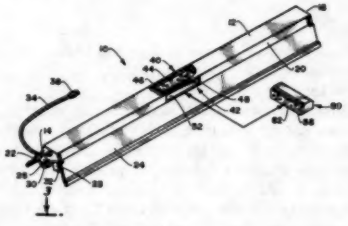
1. A mounting structure for mounting a vehicular lighting unit to a mounting port formed on a body panel by inserting said lighting unit through said mounting port, said lighting unit being partly covered by a cover member, said mounting structure comprising a mounting section formed on said lighting unit, said mounting port having a notch formed on the outer periphery of said mounting port, said mounting section comprising at least one engaging portion provided on the outer periphery of the mounting section, the shape of said engaging portion corresponding to said notch so as to pass through said notch when assembling, and a flange provided along the outer periphery of said mounting section such that said body panel along the outer periphery of said mounting port is sandwiched by said engaging section and said flange when said engaging section is rotated upon assembling, and said mounting structure further comprising a restriction means for making it impossible to rotate said lighting unit from the outside without removing said cover member, wherein said restriction means is a member provided close to said lighting unit for preventing access to said mounting section after assembly and said restriction means comprises an arch-like member vertically surrounding said lighting unit.

4,674,015

FLUORESCENT LIGHT FIXTURE WITH REMOVABLE BALLAST

Daniel R. Smith, 2051 Maple St., Des Moines, Iowa 50317

Filed May 5, 1986, Ser. No. 859,995
Int. Cl.[4] F21S *3/00*
U.S. Cl. 362—217 **15 Claims**



1. In a fluorescent light fixture comprising:

a housing having a top plate for mounting on a structural surface and side plates extending downwardly from side edges of said top plate, wherein fluorescent lights are

located beneath said top plate and proximate said side plates;

an opening in one of said side plates by which a ballast is replaceably inserted into an enclosure, said enclosure including a wall having a plurality of electrical contact tabs;

said ballast having a wall with a plurality of electrical contact tabs corresponding to each of said enclosure wall tabs for forming an electrical contact therewith and completing an electrical circuit through the ballast.

4,674,016

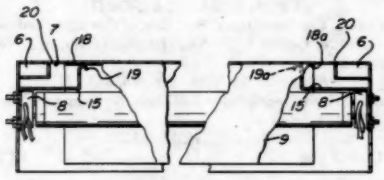
LIGHTING APPARATUS

P. Christopher J. Gallagher, Electronic Advanced Systems Corp., 5 Portland Rd., West Conshohocken, Pa. 19428

Filed Mar. 17, 1986, Ser. No. 840,441

Int. Cl.[4] F21V *1/00*

U.S. Cl. 362—240 **11 Claims**



1. A method of modifying a lighting apparatus comprising at least one pair of original sockets mounted in spaced relationship to each other, and a pair of light sources, each of said light sources being at least partly supported by a separate socket of said pair of original sockets, each of said original sockets being connected through original wiring connections to a source of electric current, and each light source of said pair being connected to said source of electric current through the original socket by which it is at least partly supported, said method comprising the steps of:

(a) removing both light sources from said original sockets;

(b) leaving at least one of said original sockets in its original position and connected to said original wiring connections;

(c) securing a new socket in the lighting apparatus at a position such that the new socket is intersected by a first imaginary plane located between the positions of said original sockets said first imaginary plane being perpendicular to a second imaginary plane intersecting the positions of the original sockets;

(d) electrically connecting said new socket to said original wiring connections by connecting said new socket through an adapter plug to one of the original sockets in its original position; and

(e) installing a light source in said new socket;

whereby a single light source is substituted for said pair of light sources.

4,674,017

PLASTIC PAR LAMP CONSTRUCTION

Irving Bradley, Novelty, and James M. Hanson, Euclid, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 61,911, Jul. 30, 1979, Pat. No. 4,344,120. This application Jul. 16, 1981, Ser. No. 284,051

The portion of the term of this patent subsequent to Aug. 10, 1999, has been disclaimed.

Int. Cl.[4] F21V *7/00*

U.S. Cl. 362—349 **6 Claims**

1. An improved rectangular shaped PAR lamp which comprises a molded plastic reflector member having a parabolic shaped cavity, one pair of opposing generally parallel planar walls which intersect the parabolic cavity to form the longer sides of said rectangular shape, a second pair of opposing generally parallel planar walls which intersect the parabolic cavity to form the shorter sides of said rectangular shape, all said planes terminating at a rectangular shaped sealing rim, receptacle means disposed on the rear side of said reflector which accommodates a prefocused mount construction having a light source at the focus of said reflector and with said prefocused mount being sealed to the receptacle means of said reflector, with the wall thickness of said planar walls being sufficiently greater adjacent to the sealing rim than in the adjoining wall region of said parabolic cavity to avoid mechanical and heat distortion and wherein said greater thickness region is produced by varying the wall draft angle for said molded reflector member, and a rectangular shaped plastic lens sealed to the front surface of the sealing rim of said reflector.

4,674,018

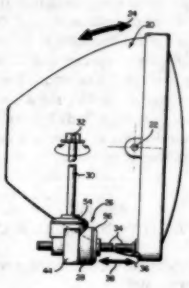
HEADLAMP ADJUSTING MECHANISM

Francis E. Ryder, and Stephen P. Lisak, both of Arab, Ala., assignors to Ryder Internation Corporation, Arab, Ala. and Textron Inc., Providence, R.I., a part interest

Continuation-in-part of Ser. No. 794,092, Oct. 31, 1985, abandoned. This application Apr. 14, 1986, Ser. No. 851,331

Int. Cl.[4] F21M *3/18*; F21S *1/02, 3/02*

U.S. Cl. 362—424 **20 Claims**



1. An adjusting mechanism for a headlamp, or the like, comprising: a one-piece molded housing member having a first gear receiving bore, and a second gear receiving bore disposed transversely to said first gear receiving bore, with said bores intersecting at a peripheral location with respect to each; a first drive gear means disposed in said first gear receiving bore, and a second adjusting gear means disposed in said second gear receiving bore, with said gear means being engageable at the locations where said first and second housing bores intersect; drive means coupled with said first drive gear means and extending from said housing; and adjusting means coupled with said second adjusting gear means and extending from said housing for engagement with a headlamp or the like, apertured cap members for each said first and second gear receiving bores, with the drive means and adjusting means extending through said cap member apertures, and said one-piece housing and said cap members providing journalling means for said gear means, such that by rotation of said drive means linear

movement will be imparted to said adjusting means by said first and second gear means when engaged, said linear movement being usable to effect adjustment of a headlamp assembly or the like.

4,674,019

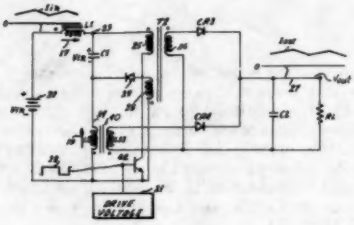
TRANSFORMER-COUPLED TWO-INDUCTOR BUCK CONVERTER

Robert M. Martinelli, Torrance, Calif., assignor to Keller-Mullett Technology, Los Angeles, Calif.

Filed Apr. 16, 1986, Ser. No. 852,566

Int. Cl.[4] H02M *3/335*

U.S. Cl. 363—20 **16 Claims**



15. A buck converter for supplying from a d.c voltage source a reduced level d.c. voltage for a load, said converter comprising:

an input inductor wound to have a positive polarity end;

a capacitor;

a grounded inductor wound to have a positive polarity end;

means for connecting said input inductor, said capacitor and said grounded inductor to form a series circuit with said d.c. voltage source applied across said series circuit,

means including a switching transistor responsive to input current in the input inductor and current conducted through said grounded inductor to provide output current to the load when the switching transistor is turned on; and

means including a normally turned off diode responsive to stored current energy in the input inductor and stored current energy in the grounded inductor to turn on the diode and provide output current to the load when the switching transistor is turned off.

4,674,020

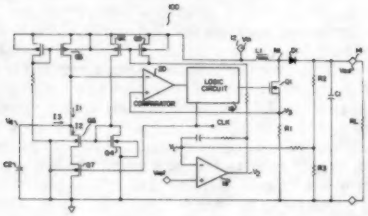
POWER SUPPLY HAVING DUAL RAMP CONTROL CIRCUIT

Lorimer K. Hill, Cupertino, Calif., assignor to Siliconix Incorporated, Santa Clara, Calif.

Filed Dec. 13, 1985, Ser. No. 808,575

Int. Cl.[4] H02M *3/335*

U.S. Cl. 363—21 **16 Claims**



1. A power supply comprising:

an inductive element;

a switch coupled in series with said inductive element, said switch periodically opening and closing;

output terminal for providing power to a load, the power delivered to said load being determined in response to the current through said inductive element just before said switch opens;

means for generating a first voltage indicative of the current through said inductive element;

means for generating a second voltage such that said second voltage changes during a time period in which said switch is closed, said second voltage changing at a rate determined by the magnitude of the voltage at said output terminal; and

a comparator for causing said switch to open, said comparator comparing said first voltage with said second voltage.

4,674,021

STATIC INVERTER WITH AN OVERCURRENT CIRCUIT UPON A SHORT CIRCUIT

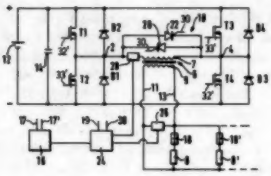
Klaus Sachs, Osterode/Harz, Fed. Rep. of Germany, assignor to Anton Piller GmbH & Co. KG, Osterode/Harz, Fed. Rep. of Germany

Filed May 29, 1986, Ser. No. 868,777

Claims priority, application Fed. Rep. of Germany, May 29, 1985, 3519151

Int. Cl.[4] H02H *7/122*

U.S. Cl. 363—56 **4 Claims**



1. A static inverter for providing an alternating output voltage from a DC input voltage, the inverter having at least four semiconductor switches arranged in pairs of two switches each, with the switches of each pair being connected in series with each other, one terminal of each switch in each pair being connected to a respective terminal of a DC power source and the other terminals of each two paired switches being connected to a respective common point, a respective freewheeling diode connected anti-parallel to each switch, a load circuit between each two common points forming a respective output of the inverter, and a first control device arranged for delivering control signals to said switches for controlling the output voltage of the inverter between each two associated common points;

wherein the improvement comprises:

(a) a respective pair of anti-parallel thyristors connected across each associated pair of common points; and

(b) a second control device for delivering control signals to said switches and said thyristors in response to the magnitude of the current flow in each load circuit;

(c) said control devices being arranged such that, upon occurrence of a short circuit in a load circuit, (i) said second control device takes over control of said switches from said first control device and operates the respective switches between two current limits, one of which is higher and represents the maximum allowable current for said switches, and the other of which is lower but is still much higher than the rated output current, and (ii) said second control device, when taking over the control upon the higher current limit being reached, operates to block said switches and to fire that one of the associated thyristors which is conductive in the direction of the actual current flow in the respective load circuit, and upon the

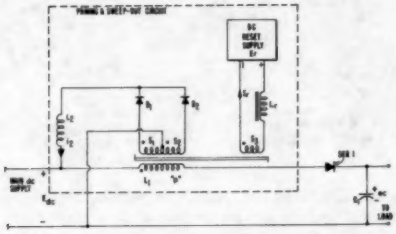
lower current limit being reached, operates to release said switches.

4,674,022

SCR PRIMING AND SWEEP-OUT CIRCUIT APPARATUS

Peter Ver Planck, Sudbury, Mass., assignor to Megapulse, Inc., Bedford, Mass.

Filed Jul. 1, 1986, Ser. No. 880,713
Int. Cl.[4] H03K 17/72, 17/292, 17/13
U.S. Cl. 363—57 5 Claims



1. A priming and sweep-out circuit for an SCR pulse generator comprising saturable-core inductor means for enabling energy storing and discharging under the control of the gating of series-connected SCR-switching means, said circuit having, in combination, secondary winding means transformer-coupled with said saturable inductor means and connected at each of its terminals through respective diode means and storage inductance to one side of a D.C. power supply, the other side of the supply being connected to an intermediate terminal of said secondary winding means.

4,674,023

METHOD AND APPARATUS FOR RECOGNIZING THE CUTOFF STATE OF A THYRISTOR WHICH CAN BE SWITCHED OFF

Michael Peppel, Uttenreuth, and Theodor Salzmann, Erlangen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jun. 11, 1986, Ser. No. 872,953
Claims priority, application Fed. Rep. of Germany, Jun. 19, 1985, 3521920; Oct. 17, 1985, 3537050
Int. Cl.[4] H02H 7/122
U.S. Cl. 363—57 17 Claims

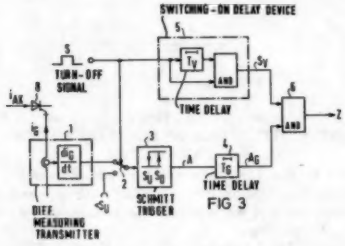


FIG 3

13. Apparatus for recognizing the cut-off state of a thyristor which can be switched off (GTO thyristor) by a turn-off signal, the thyristor having a cathode, anode and control gate, for determining if the thyristor is alloyed-through after an unsuccessful turn-off attempt and for forming a state signal characterizing the occurrence of the cut-off state from the derivative in time of the current flowing into the gate of the thyristor, comprising:

driver means addressed by the turn-off signal for supplying the thyristor with a negative switching voltage between its gate and cathode electrode;

differentiating measuring means for forming the derivative in time of the gate current;

Schmitt trigger means having a predetermined positive and negative switching limit for providing a binary signal from the derivative in time of the gate current, whereby said Schmitt-trigger means generates said binary signal when the sign of said derivative reverses and exceeds the predetermined positive limit, said predetermined positive limit chosen larger than the maximum positive value of the derivative in time of the gate current during a turn-off attempt occurring in the case of GTO thyristor which is alloyed-through;

comparator means for monitoring a switching voltage at the output of the driver means for an adjustable lower threshold;

means for generating an auxiliary signal having a switch-on delay via an adjustable delay time which is triggered by an output of said comparator means; and

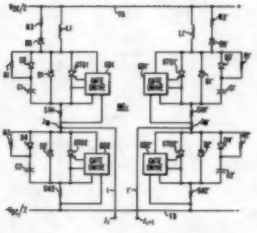
logic means for combining the binary signal and the auxiliary signal to form the state signal.

4,674,024

HIGH VOLTAGE MODULAR INVERTER AND CONTROL SYSTEM THEREOF

Derek A. Paice, Palm Harbor, Fla., and Charles W. Edwards, Monroeville, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 5, 1986, Ser. No. 871,048
Int. Cl.[4] H02M 7/515
U.S. Cl. 363—71 13 Claims



1. In a high voltage modular multi-inverter system, the combination of individual modules each comprising a DC voltage source having positive and negative DC terminals, a pole combination of serially connected power switches connected between said DC terminals about a center tap junction point and an output line derived from said center tap junction point, and control means for controlling for conduction said power switches to alternately connect said DC terminals to said output line at a predetermined selectable frequency;

with two of said modules being associated in parallel as a pair to form between corresponding two said output lines an elementary phase output;

a plurality of said pairs of modules being connected in series to develop a series output combining the same plurality of said elementary phase outputs in series, whereby a high-voltage resultant phase output is obtained.

4,674,025

MULTI-INVERTER CONTROL APPARATUS

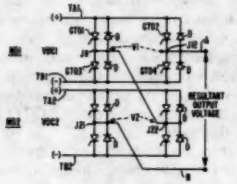
Charles W. Edwards, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 5, 1986, Ser. No. 871,047
Int. Cl.[4] H02M 1/12
U.S. Cl. 363—71 4 Claims

1. In a multi-inverter system including at least two inverters

connected in series for outputting a compound voltage, the combination of:

means for controlling said inverters to establish a predetermined phase shift between the respective output voltages of said inverters; and



means responsive to a recurrent triggering signal for exchanging said inverters under said controlling means, whereby the average power derived from each inverter as a function of time is balanced out.

4,674,026

DELTA-CONNECTED CIRCULATING CURRENT CYCLOCONVERTER APPARATUS

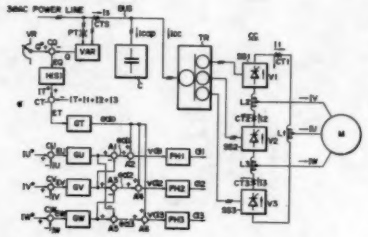
Shigeru Tanaka, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 30, 1984, Ser. No. 636,022

Claims priority, application Japan, Aug. 12, 1983, 58-146557; Aug. 12, 1983, 58-146560

Int. Cl.[4] H02M *5/257*; G05F *1/70*

U.S. Cl. 363—160 **11 Claims**



1. A cycloconverter apparatus comprising:

at least three sets of power converters coupled to a load and to an AC power supply, said power converters being connected in a delta fashion to form a circulating current type cycloconverter;

load current control means coupled to said power converters for generating load current control signals which correspond to load currents flowing through said load;

reactive power control means coupled to said AC power supply for detecting reactive power at the AC power supply side of said power converters to generate a reactive power control signal;

current sum control means coupled to said power converters and to said reactive power control means for detecting respective output currents from said power converters and generating a current sum control signal which corresponds to the sum of said output currents and to said reactive power control signal; and

phase control means coupled to said load current control means, to said current sum control means and to said power converters, for controlling the triggering phase of each of said power converters in accordance with said load current control signals and said current sum control signal.

4,674,027

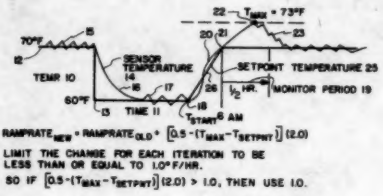
THERMOSTAT MEANS ADAPTIVELY CONTROLLING THE AMOUNT OF OVERSHOOT OR UNDERSHOOT OF SPACE TEMPERATURE

Thomas J. Beckey, Edina, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 19, 1985, Ser. No. 746,474

Int. Cl.[4] G05D *23/00*

U.S. Cl. 364—143 **9 Claims**



1. Clock thermostat means adaptively controlling the amount of overshoot or undershoot of space temperature due to changes in the current temperature setpoint of said thermostat means, including: microcomputer means including real time clock means and memory means; data input means connected to said microcomputer means to input a sequence of desired heat and cool control temperature setpoints and times for a desired temperature control by said thermostat means; temperature sensor means including connection means to monitor temperature at said thermostat means; said connection means connected to said microcomputer means to communicate a temperature at said sensor means to said microcomputer means; said thermostat means further including output switch means adapted to control heating and cooling equipment by said thermostat means; said microcomputer means and said memory means including overshoot-undershoot correction program means which is operable to adjust a ramprate slope of a current temperature setpoint of said thermostat means; said overshoot-undershoot correction program means and said memory means providing a ramprate slope that reduces an overshoot-undershoot of said space temperature due to a change in said current temperature setpoint; and said overshoot-undershoot correction program means and said memory means creating a new ramprate slope after a temperature setpoint change to progressively adjust said ramprate slope of said thermostat to limit the amount of overshoot-undershoot of said space temperature to an acceptable level.

4,674,028

IDENTIFICATION METHOD OF A PROCESS PARAMETER

Makoto Shioya, Tokyo; Teruji Sekozawa, Kawasaki; Motohisa Funabashi, Sagamihara; Masahiro Ishida, and Hiroatsu Tokuda, both of Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 16, 1985, Ser. No. 691,908

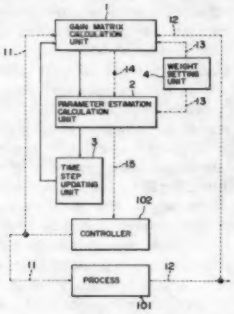
Claims priority, application Japan, Jan. 18, 1984, 59-5575

Int. Cl.[4] G05B *13/02*

U.S. Cl. 364—148 **6 Claims**

1. In a method of identification of a process parameter to minimize a sum of weighted squares of residuals defined in accordance with a relationship between process input information and process output information in a plurality of time steps from an initial time step to a current time step, the improvement comprising the step of optimally identifying the process

parameter in a sense of a least square method for each corresponding time step in a recursive form based on said input



information and output information when the weight of the squares changes for each time step.

4,674,029

OPEN-LOOP CONTROL SYSTEM AND METHOD UTILIZING CONTROL FUNCTION BASED ON EQUIVALENT CLOSED-LOOP LINEAR CONTROL SYSTEM

Inge Maudal, Claremont, Calif., assignor to General Dynamics, Pomona Division, Pomona, Calif.

Filed Dec. 3, 1984, Ser. No. 677,762
Int. Cl.[4] G05B *13/04, 17/02*
U.S. Cl. 364—148 **16 Claims**

1. An open-loop system for controlling a plant, comprising:
actuation means for providing an actuating signal, said actuation means comprising:
sense means for sensing a condition that a plant is to respond and for providing a continuous sense signal representative of said sensed condition, and
sample means for periodically sampling said sense signal at a predetermined sampling interval and for providing said actuating signal as a series of impulse signals corresponding to the samples of said sense signal; and
control means responsive to said actuating signal for providing a control signal to the plant in accordance with a control function defined by a control algorithm based upon a calculated response of a plant in an equivalent closed-loop linear control system, said control means comprising a computer for providing said control signal as a function of time following the application of each impulse signal thereto.

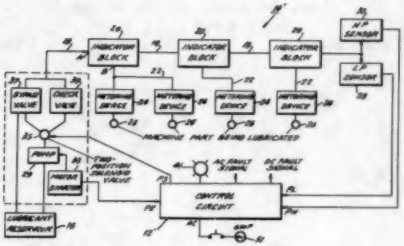
4,674,030

LUBRICATING SYSTEM CONTROL CIRCUIT

Paul K. Gabriel, West Paterson; David E. Potvin, Wyckoff, both of N.J., and James R. Potvin, Whitinsville, Mass., assignors to Bijur Lubricating Corp., Bennington, Vt.

Filed Jan. 24, 1984, Ser. No. 573,351
Int. Cl.[4] G05B *23/02*; F01M *1/18*
U.S. Cl. 364—184 **19 Claims**

1. A lubricating system, comprising:
a fluid distribution system for distributing a lubricating fluid to one or more parts of an operating machine; and
a control system for controlling the operation of said fluid distribution system, said control system including first means for detecting a non-erroneous fault condition in said fluid distribution system and generating a first signal in response thereto and second means for generating a delayed fault signal indicative of the presence of said



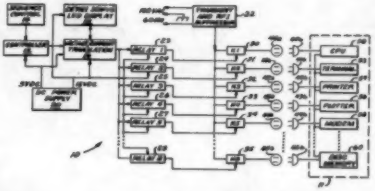
non-erroneous fault condition a preset time interval after said first signal is generated irrespective of whether said fault condition continues after the generation of said first signal.

4,674,031

PERIPHERAL POWER SEQUENCER BASED ON PERIPHERAL SUSCEPTIBILITY TO AC TRANSIENTS

Andrew F. Siska, Jr., Westmont, Ill., assignor to Cara Corporation, Lombard, Ill.

Filed Oct. 25, 1985, Ser. No. 791,413
Int. Cl.[4] G05B *9/02*; H02J *1/00*
U.S. Cl. 364—184 **10 Claims**

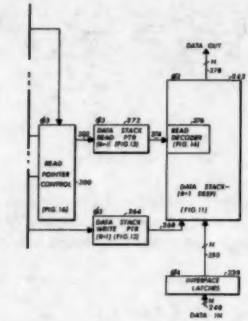


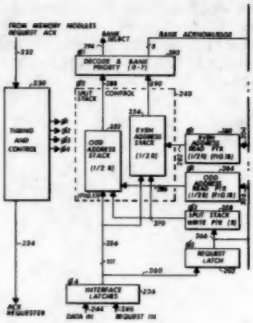
1. In a system having a central processor unit and a plurality of peripheral devices coupled thereto wherein said central processor unit and each of said peripheral devices is coupled to and energized by an AC power source and wherein the operation of said peripheral devices is under the control of said central processor unit with each of said peripheral devices characterized by a unique susceptibility to AC power source transients giving rise to improper operation of the peripheral device, a power controller comprising:
a plurality of switch means each coupled to said AC power source and to a respective peripheral device for providing AC power thereto;
control means coupled to each of said switch means for providing a respective control signal thereto whereupon a respective switch means is rendered conductive for providing AC power to a peripheral device coupled thereto; and
sequence means coupled to said control means for causing said control means to provide said control signals to and to remove said control signals from each of said switch means such that AC power is provided last and is removed first in a sequential manner from those peripheral devices having a higher susceptibility to AC power source transients and AC power is provided first and is removed last in a sequential manner from those peripheral devices having a lower susceptibility to AC power source transients.

4,674,032
HIGH-PERFORMANCE PIPELINED STACK WITH OVER-WRITE PROTECTION

Wayne A. Michaelson, Lake Elmo, Minn., assignor to Unisys Corporation, New York, N.Y.

Filed Apr. 2, 1984, Ser. No. 596,203
Int. Cl.[4] G06Z *12/16, 9/00*
U.S. Cl. 364—200 5 Claims





1. In a high performance storage unit for pipelined interaction with multiple requesting units, and having a plurality of memory banks, each with multiple locations and addressing means, memory bank access control circuitry for decoding, prioritizing, and issuing bank acknowledge signals in response to applied selection signals, a source of clock signals distributed in the unit for pipelining up to R requests for access to the memory banks without having received an acknowledge signal indicating that an access has been completed, a high performance pipeline data stack structure comprising:

request receiving means for receiving request in signals from an associated requester;

bank acknowledge receiving means for receiving bank acknowledge signals;

interface means for receiving data words to be written in memory banks at addressed locations;

clock signal receiving means for receiving predetermined ones of the clock signals for timing operation of the structure;

data stack means coupled to said interface means and said clock signal receiving means for receiving data words and at least temporarily storing said data words when enabled by predetermined ones of the clock signals, pending availability of access to the selected memory banks, said data stack means including R+1 data stack register means for protecting at least R ones of said data stack register means against over-write at all times;

data stack write pointer means coupled to said data stack means for providing write address signals indicative of said R+1 data stack register means in a predetermined order and for enabling storage of the data words therein, and having write pointer advance means coupled to said request receiving means for advancing said data stack write pointer means for advancing said data stack write pointer means to address the next sequential one of said R+1 data stack register means in response to each request in signal received;

data stack read pointer means, which includes read counter means for circularly counting in response to said bank acknowledge signals and first ones of said clock signals, and for providing R+1 ones of said read address signals, each for addressing an associated ones of said R+1 stack register means, coupled to said data stack means for providing read address signals indicative of said R+1 data stack register means in a predetermined order, and having read pointer advance means coupled to said bank acknowledge receiving means for advancing said data stack read pointer means to address the next sequential one of said R+1 data stack register means in response to each bank acknowledge signal received; and

read decoder means, which further comprises decode circuits coupled to said read counter means for providing R+1 unique read enable signals in response to said address signals, coupled to said data stack read pointer means for decoding said read address signals and enabling the read out of the selected ones of said R+1 data stack register means in response thereto to provide a high performance storage unit utilizing a pipelined virtual data stack controlled by a write pointer and a read pointer and controlled such that input data can be pipelined and output data can be pipelined and the stack is operated to prevent over-writing of stack registers that may not have been read out.

4,674,033
MULTIPROCESSOR SYSTEM HAVING A SHARED MEMORY FOR ENHANCED INTERPROCESSOR COMMUNICATION

Christopher G. Miller, Sevenoaks, England, assignor to British Telecommunications public limited company, Great Britain

Filed Oct. 24, 1984, Ser. No. 664,347
Claims priority, application United Kingdom, Oct. 24, 1983, 8328396
Int. Cl.[4] G06Z *12/00, 15/56;* H04T *3/24*
U.S. Cl. 364—200 41 Claims

28. A packet switching apparatus comprising a master processor, a plurality of independently controlled slave proces-

sors, a common memory, a bus connecting the master processor and the slave processor to the common memory; a plurality of ports including a first port, for receiving or transmitting asynchronous data, said first port being connected to a first slave processor and a second port, for transmitting or receiving packets of data, said second port being connected to a second slave processor, wherein the system is arranged to transfer data between the said ports via the common memory; said common memory comprising:

(a) a plurality of data buffers arranged to be written to by a slave processor and read from by another slave processor,

(b) a plurality of message buffers for storing messages, in which each message includes a label identifying a destination processor and a data pointer identifying a data buffer,

(c) a single input word location associated with each slave processor such that information is only supplied to an input word location from its associated slave processor, and

(d) an output queue associated with each slave processor such that the contents of an output queue are only read by its associated processor, wherein:

(e) a slave processor receives data from a port and loads said data to a selected data buffer, loads a message to a selected message buffer indicating the position of the selected data buffer and loads a message buffer indicator to its associated input word location,

(f) the master processor scans all the input word locations and on detecting said message buffer indicator loads the message to the output queue of the destination processor, and

(g) the destination processor reads the message in its output queue and assumes control of the selected data buffer whereby data in the selected data buffer is processed and transmitted via an output port connected to the destination slave processor.

4,674,034

DATA PROCESSING MACHINE SUITABLE FOR HIGH-SPEED PROCESSING

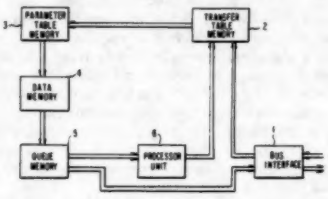
Masao Iwashita, and Tsutomu Tenma, both of Tokyo, Japan, assignors to Nippon Electric Co. Ltd., Tokyo, Japan

Division of Ser. No. 436,130, Oct. 22, 1982, Pat. No. 4,594,653. This application Dec. 12, 1985, Ser. No. 808,192

Claims priority, application Japan, Oct. 22, 1981, 56-169152; Dec. 14, 1981, 56-201272; Jan. 12, 1982, 57-2985; Jan. 26, 1982, 57-10309

Int. Cl.[4] G06F *9/38, 13/00*

U.S. Cl. 364—200 **2 Claims**



1. A data processing machine comprising a first memory for storing destination addresses designating locations of instructions used in data processing, a second memory accessed with the destination addresses output from said first memory and storing said instructions, an arithmetic means for executing an arithmetic operation according to the instructions read out of said second memory, a third memory for temporarily storing first data which has reached said third memory from said second memory in advance of a second data which is needed with said first data for an arithmetic operation, until said second data reaches said third memory, a queue memory for storing data read out from said third memory waiting to be processed in said arithmetic means and data waiting to be transferred to the outside of said data processing machine, said queue memory separately storing data to be used in the operation of an instruction which does not increase the amount of data to be stored in said queue memory and data to be used in the operation of an instruction which will increase the amount of data to be stored in said queue memory, an interface means for transferring data received from the outside of said data processing machine to said first memory and transferring data from said queue memory to the outside of said data processing machine, and bus means for coupling said first memory, said second memory, said third memory, said queue memory and said arithmetic means in a ring shape, and control means coupled to said interface means and said queue memory for monitoring an amount of data stored in said queue memory and for inhibiting the transfer of data from said interface means to said first memory when the amount of data in said queue memory exceeds a predetermined amount.

4,674,035

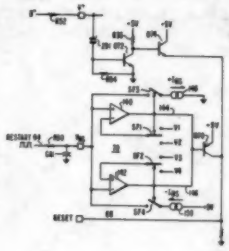
SUPERVISORY CIRCUIT FOR A PROGRAMMED PROCESSING UNIT

Joseph C. Engel, Monroeville Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 19, 1985, Ser. No. 725,050

Int. Cl.[4] G06F *11/28;* **H03K** *5/159*

U.S. Cl. 364—200 **9 Claims**



1. A circuit for use in an integrated circuit to supervise the program execution of a processing unit by monitoring a restart signal, generated by said processing unit during the program execution thereof, to identify improper program execution conditions and to attempt to alleviate said improper conditions by generating a reset signal which is supplied to said processing unit to govern the program execution thereof to a prespecified point from which point program execution may continue upon removal of said reset signal, said restart signal being generated within a predetermined duty cycle range under proper program execution conditions and out-of-range under improper program execution conditions, said supervising circuit comprising:

circuit means for generating a first signal at a value representative of the apparent range of said restart signal;

first circuit means responsive to said first signal and a first reference signal to generate a first control signal when the value of said first signal is greater than the value of said first reference signal;

second circuit means responsive to said first signal and a second reference signal to generate a second control signal when the value of said first signal is less than the value of said second reference signal;

third circuit means for setting the first reference signal at a first value and the second reference signal at a second value, said first value being greater than said second value;

fourth circuit means coupled to said third circuit means and governed by the generated first control signal to cause the first reference signal to change from said first value setting to a third value swtting which is sustained during said first

control signal generation, said third value setting being less than said first value setting;

fifth circuit means coupled to said third circuit means and governed by the generated second control signal to cause the second reference signal to change from said second value setting to a fourth value setting which is sustained during said second control signal generation, said fourth value setting being greater than said second value setting;

sixth circuit means coupled to said first signal generating circuit means and governed by the generated first control signal to cause the first signal to decrease in value at a first predetermined rate during the first control signal generation;

seventh circuit means coupled to said first signal generating circuit means and governed by the generated second control signal to cause the first signal to increase in value at a second predetermined rate during the second control signal generation; and

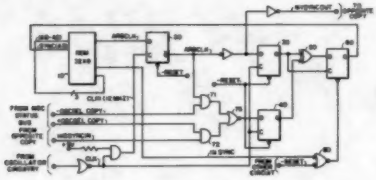
circuit means governed by the generated first and second control signals to generate said reset signal.

4,674,036

DUPLEX CONTROLLER SYNCHRONIZATION CIRCUIT FOR PROCESSORS WHICH UTILIZES AN ADDRESS INPUT

Joseph A. Conforti, Phoenix, Ariz., assignor to GTE Communication Systems Corporation, Phoenix, Ariz.

Filed Nov. 23, 1984, Ser. No. 674,212
Int. Cl.[4] G11C *8/00*; G06F *11/00*
U.S. Cl. 364—200 **8 Claims**



1. In a fault tolerant processor system including a clock, a plurality of processors is connected to at least two synchronously operating processor controllers, including one and another processor controller, each processor controller including a circuit for synchronizing, said circuit for synchronizing said processor controllers comprising:

sequencing means cyclically operated to produce a plurality of address output signals, a controller clock signal and a clear signal, said plurality of address output signals being transmitted via a plurality of address leads connecting said address outputs to a corresponding plurality of address inputs to produce a plurality of address input signals to further operate said sequencing means;

means for selecting a selected controller clock signal connected to said sequencing means and to a circuit for synchronizing said other processor controller, said selecting means being operated in response to a controller clock signal of said other processor controller to transmit said selected controller clock signal;

detecting means connected to said clock, to said sequencing means and to said selecting means, said detecting means operated in response to said selected controller clock signal of said sequencing means and to said selected controller clock signal of said detecting means of said other processor controller to determine a miscomparison of said controller clock signals and to produce a miscomparison signal in response to said miscomparison;

indicating means connected between said detecting means and said sequencing means, said indicating means being operated in response to said miscomparison signal to produce an add eight address input signal;

said sequencing means being further operated in response to said add eight address input signal to produce a fixed next sequence of said address output signals, said controller clock signal and said clear signal; and

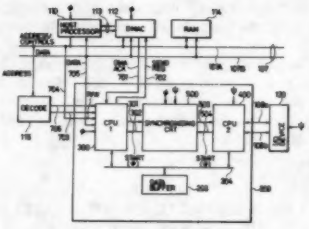
said selecting means being further connected to at least one processor of said plurality and said selecting means being operated to transmit said controller clock signal of said other processor controller or to transmit said controller clock signal of said sequencing means to said detecting means.

4,674,037

DATA PROCESSING SYSTEM WITH AN ENHANCED COMMUNICATION CONTROL SYSTEM

Tsuneo Funahashi, Bunkyo; Kazuhiko Iwasaki, Kokubunji; Noboru Yamaguchi, Higashiyamato; Takanori Shimura, Kokubunji, and Junichi Tatezaki, Kodaira, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 11, 1985, Ser. No. 690,609
Claims priority, application Japan, Jan. 11, 1984, 59-1909
Int. Cl.[4] G06F *15/16*
U.S. Cl. 364—200 **13 Claims**



1. A data processing system, comprising:

data processor means connected to a first bus for processing data, including means for sending a data-send-command onto said first bus;

data storage means connected to a second bus;

first means connected to said first and second buses and operating in synchronism with a first clock signal, for responding to said data-send-command by generating a first signal which is synchronous with said first clock signal, and for responding to a second signal provided to said first means which is in synchronism with said first clock signal by reading out data from said data storage means by way of said second bus and transferring the read-out data onto said first bus, so that said data processor means receives said read out data;

data source means operating in synchronism with a second clock signal for providing data to be processed by said data processor means or for receivng data processed by said data processor means;

second means connected to said second bus and said data source means and operating in synchronism with the second clock signal for responding to a third signal provided to said second means which is synchronous with said second clock signal by reading out data from said data source means, writing said read-out data into said data storage means by way of said second bus and providing a fourth signal in synchronism with said second clock signal after writing of the read-out data; and

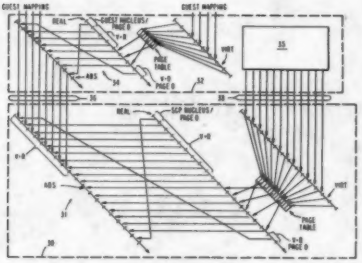
third means connected to said first and second means and responsive to said first and second clock signals and said first and fourth signals for providing to said second means said third signal after receipt of said first signal and for providing to the first means said second signal after receipt of said fourth signal.

4,674,038

RECOVERY OF GUEST VIRTUAL MACHINES AFTER FAILURE OF A HOST REAL MACHINE

David P. Breisford, Hyde Park; Daniel D. Cerutti, Kingston; Leslie S. Coleman, Rhinebeck; Gerald A. Davison, Ulster Park; Pamela H. Dewey, Poughkeepsie; Margaret C. Enichen, Poughkeepsie; Sarah T. Hartley, Poughkeepsie; Paul A. Malinowski, Poughkeepsie; Roger W. Rogers, Poughkeepsie; Peter H. Tallman, Wappingers Falls, and Lynn A. Czak, Rhinebeck, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 28, 1984, Ser. No. 687,073
Int. Cl.[4] G06F 9/44, 11/00
U.S. Cl. 364—200 4 Claims



1. In a data processing system which includes storage, a channel subsystem having I/O devices attached thereto, at least one real machine executing a host operating system and a start interpretive execution instruction that initiates the operation of at least one virtual machine having a virtual processor executing a guest operating system, a method for providing for virtual machine survival following a system incident such as a machine check including a simulated machine check, such as instruction processing damage, which occurs when said host operating system does not successfully simulate an instruction of said guest operating system, and timer damage, or a channel check or a checkstop or a malfunction detected as part of an I/O operation such as an invalid checking block code detected in storage or in a real storage key, comprising the steps of:

assigning a first and second nonvolatile area of said storage to said virtual machine by said host operating system in which said first area is in said virtual machine main storage area and said second area, which is an extension of said first area, contains control blocks that describe said virtual machine to said host operating system which controls said virtual machine in said first area of said storage,

accessing said second area of said storage for requests made for said virtual machine prior to detection of said system incident,

detecting said system incident, determining that said virtual machine is eligible for survival by detecting a bit set in a field in one of said control blocks in said second area of storage prior to said detection of said system incident, copying information about I/O devices dedicated to said virtual machine from said first area of said storage to said second area of said storage, recording the cureent status of said virtual machine in said second area of storage and verifying that said dedicated I/O devices will permit survival of said virtual machine, all for the purpose of maintaining the integrity of said virtual machine following said survival,

terminating said real machine and suspending said virtual machine in response to the detection of said system incident,

refreshing said host operating system in said real machine following the detection of said system incident and restoring said virtual machine in said first area of said storage with data in said second area of said storage, restoring said virtual machine using said I/O devices dedicated to said virtual machine in said first area of storage from said second area of said storage and restarting said virtual machine, and

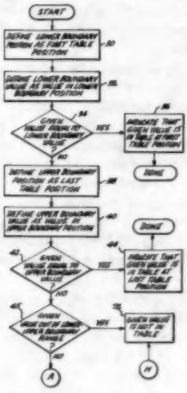
presenting the error that caused said system incident to the guest operating system of said virtual processor affected by said error once said virtual machine is restarted following said refreshing of said host operating system in said real machine in order to prevent said virtual machine from damaging its operating system.

4,674,039

METHOD FOR DETERMINING WHETHER A GIVEN VALUE IS INCLUDED IN AN ORDERED TABLE OF VALUES STORED IN A COMPUTER READABLE MEMORY

Farid A. Chouery, 6738 - 19th Ave. N.W., Seattle, Wash. 98117

Filed Oct. 9, 1984, Ser. No. 658,987
Int. Cl.[4] G06F 7/34
U.S. Cl. 364—300 13 Claims


START
DEFINE LOWER BOUNDARY POSITION AS FIRST TABLE POSITION
DEFINE LOWER BOUNDARY VALUE AS VALUE IN LOWER BOUNDARY POSITION
GIVEN VALUE EQUAL TO LOWER BOUNDARY VALUE
YES
INDICATE THAT GIVEN VALUE IS IN TABLE AT FIRST TABLE POSITION
DONE
NO
DEFINE UPPER BOUNDARY POSITION AS LAST TABLE POSITION
DEFINE UPPER BOUNDARY VALUE AS VALUE IN UPPER BOUNDARY POSITION
DONE
GIVEN VALUE EQUAL TO UPPER BOUNDARY VALUE
YES
INDICATE THAT GIVEN VALUE IS IN TABLE AT LAST TABLE POSITION
NO
GIVEN VALUE OUT OF ORDER WITH BOUNDARY VALUES
YES
GIVEN VALUE IS NOT IN TABLE
NO
A

8. A method for operating a digital computer that includes computer memory means to determine whether a given value is included in an ordered table of values stored in the computer memory means and, if so, the position in the table at which the given value is included, the method comprising:

(a) defining a lower boundary position as the first table position in the computer memory means and a lower boundary value as the value in the lower boundary position;

(b) defining an upper boundary position as the last table position in the computer memory means and an upper boundary value as the value in the upper boundary position;

(c) determining by interpolation an assumed position for the given value in the computer memory means between the lower and upper boundary positions;

(d) comparing the value in the assumed position to the given value, proceeding to step (e) if they are equal, proceeding to step (f) if the value in the assumed position is greater than the given value, and proceeding to step (k) if the value in the assumed position is less than the given value;

(e) causing the computer to indicate that the given value is in the table at the assumed position, and terminating the process;

(f) adjusting the upper boundary position towards the assumed position, redefining the upper boundary value as the value at the adjusted upper boundary position, and adjusting the value of the lower boundary value towards the given value by setting the lower boundary value equal

to an average of the unadjusted lower boundary value and the given value;

(g) determining by interpolation an assumed position for the given value in the computer memory means between the lower and upper boundary positions;

(h) comparing the value in the assumed position to the given value, proceeding to step (e) if they are equal, proceeding to step (f) if the value in the assumed position is greater than the given value, and proceeding to step (i) if the value in the assumed position is less than the given value;

(i) comparing the upper and lower boundary positions, and proceeding to step (p) if they are adjacent to one another, and proceeding to step (j) if they are not adjacent to one another;

(j) adjusting the lower boundary position towards the assumed position, redefining the lower boundary value as the value at the adjusted lower boundary position, and proceeding to step (c);

(k) adjusting the lower boundary position towards the assumed position, redefining the lower boundary value as the value of the adjusted lower boundary position, and adjusting the value of the upper boundary value towards the given value by setting the upper boundary value equal to an average of the unadjusted upper boundary value and the given value;

(l) determining by interpolation an assumed position for the given value in the computer memory means between the lower and upper boundary positions;

(m) comparing the value in the assumed position to the given value, proceeding to step (e) if they are equal, proceeding to step (n) if the value in the assumed position is greater than the given value, and proceeding to step (k) if the value in the assumed position is less than the given value;

(n) comparing the upper and lower boundary positions, and proceeding to step (p) if they are adjacent to one another, and proceeding to step (o) if they are not adjacent to one another;

(o) adjusting the upper boundary position towards the assumed position, redefining the upper boundary value as the value of the adjusted upper boundary position, and proceeding to step (c); and

(p) causing the computer to indicate that the given value is not in the table, and terminating the process.

4,674,040

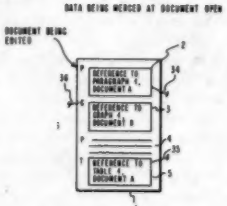
MERGING OF DOCUMENTS

Barbara A. Barker, Round Rock; Irene H. Hernandez, and Rex A. McCaskill, both of Austin, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 26, 1984, Ser. No. 686,566

Int. Cl.[4] G06F *3/153*

U.S. Cl. 364—300 **5 Claims**


DATA BEING MERGED AT DOCUMENT OPEN
DOCUMENT BEING EDITED
REFERENCE TO PARAGRAPH 4, DOCUMENT A
REFERENCE TO GRAPH 1 DOCUMENT B
REFERENCE TO TABLE 1 DOCUMENT A

1. A method for merging a portion of one document into another document, said method comprising:

(a) including a reference in said another document to said portion; and

(b) causing said portion to be merged with said another document and displayed in merged form.

4,674,041

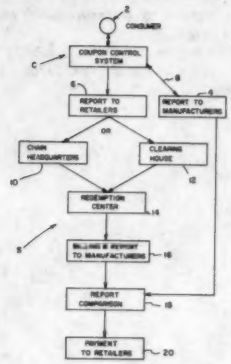
METHOD AND APPARATUS FOR CONTROLLING THE DISTRIBUTION OF COUPONS

Chester L. Lemon, Dallas, and Bill A. Kelly, Ft. Worth, both of Tex., assignors to James K. Appleton, Dallas, Tex.

Filed Sep. 15, 1983, Ser. No. 533,060

Int. Cl.[4] G07B *1/02*; G07F *7/08, 7/00*; G06F *15/24*

U.S. Cl. 364—401 **31 Claims**



1. A systen for controlling the selection and dispensing of product coupons at a plurality of remote terminals located at predesignated sites such as consumer stores wherein each terminal comprises:

activation means for activating such terminal for consumer transactions;

display means operatively connected with said activation means for displaying a plurality of coupons available for selection;

selection means operatively connected with said display means provided to permit selection of a desired displayed coupon by the consumer;

print means operatively connected with said selection means for printing and dispensing the coupon selected by the consumer; and

control means operatively connected with said display means for monitoring each consumer transaction and for controlling said display means to prevent the display of coupons having exceeded prescribed coupon limits.

4,674,042

EDITING BUSINESS CHARTS

Irene H. Hernandez, Austin; Barbara A. Barker, Round Rock; Carol S. Himelstein, and Beverly H. Machart, both of Austin, all of Tex., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Apr. 2, 1985, Ser. No. 719,233

Int. Cl.[4] G06F *3/153*

U.S. Cl. 364—401 **9 Claims**

1. A method of editing a business chart on a computer, said business chart comprising individual object components, said method comprising the steps of:

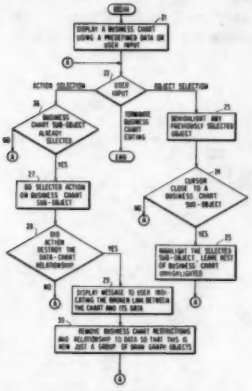
generating and displaying a business chart using a data structure containing predefined data or user input, said business chart being a group of draw graphic objects associated with one another based on the relationships created by placement of the draw graphic objects on the chart as a function of said data structure;

creating a link from said business chart to said data structure, said link being a reference between said draw graphic objects and said data structure;

directly editing individual draw graphic object components

of said business chart using actions provided for draw graphic objects; and

checking said business chart following said step of editing to determine if the integrity of the link from said business chart to said data structure has been compromised by the step of editing a draw graphic object component of said chart.

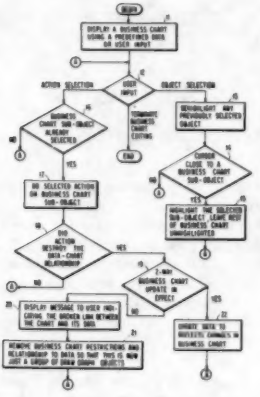


4,674,043

UPDATING BUSINESS CHART DATA BY EDITING THE CHART

Irene H. Hernandez, Austin; Barbara A. Barker, Round Rock; Carol S. Himelstein, and Beverly H. Machart, both of Austin, all of Tex., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Apr. 2, 1985, Ser. No. 719,210
Int. Cl.[4] G06F *3/153*
U.S. Cl. 364—401 **3 Claims**



1. A method of updating business chart data by editing the chart on a computer comprising the steps of:

displaying a business chart using predefined data;

creating a two-way link from said business chart to said data;

editing a selected graph object belonging to said chart so that said business chart no longer represents the predefined data; and

updating the predefined data to reflect the result of the editing action.

2. The method of updating business chart data as recited in claim 1 further comprising the steps of:

selecting either a two-way or a one-way edit mode for said chart and said data; and

determining that the two-way edit mode has been selected before performing said step of updating the predefined data.

3. The method of updating business chart data as recited in claim 2 further comprising the steps of:

checking the two-way link from said business chart to said data after the step of editing to determine if the editing action destroyed the relationship between the predefined data and the business chart; and

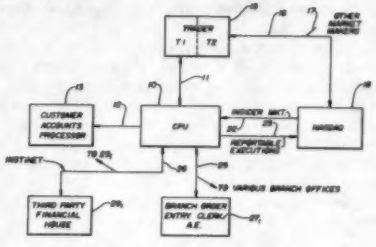
displaying message to the operator indicating broken link between the chart and the data if the relationship has been destroyed and if said two-way edit mode has not been selected.

4,674,044

AUTOMATED SECURITIES TRADING SYSTEM

Leslie P. Kalmus, New York, N.Y.; Donald R. Trojan, Stamford, Conn.; Bradley Mott, Douglaston, and John Strampfer, Greenlawn, both of N.Y., assignors to Merrill Lynch, Pierce, Fenner & Smith, Inc., New York, N.Y.

Filed Jan. 30, 1985, Ser. No. 696,407
Int. Cl.[4] G06F *15/20, 15/30*
U.S. Cl. 364—408 **10 Claims**



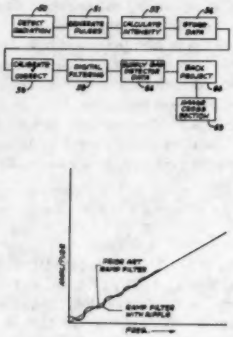
1. A data processing system for making a trading market in at least one security in which the system proprietor is acting, as a principal; said system including means for receiving trade orders for said at least one security from system customers, said trade orders including fields identifying the stock to traded and characterization of the trade as customer purchase or sale, and the number of shares for the transaction; means for retrieving and for storing operative bid and asked prices for said at least one security; means for entering and for storing order qualification parameters, said parameters and said stored prices determining which received orders are qualified for execution; means for storing data characterizing position, cost and profit for said at least one security; qualifying means responsive to said received trade offers and said stored prices and order qualification parameters for qualifying a trade order for execution when the received trade order fields do not violate the stored prices and qualification parameters; means for executing each trade order qualified by said qualification means; and post-execution updating means for incrementing said stored position in said at least one security by the amount of a trade order upon execution of a customer sale and decrementing said stored position by the amount of a trade order upon execution of a customer purchase and means for updating at least one of said stored cost and profit upon execution of a trade.

4,674,045

FILTER FOR DATA PROCESSING

Michael M. Kerber, Cleveland Heights, and Carl J. Brunnett, Mayfield Heights, both of Ohio, assignors to Picker International Inc., Highland Heights, Ohio

Filed Dec. 31, 1984, Ser. No. 688,021
Int. Cl.[4] G06F *15/42, 15/35;* G06G *7/60*
U.S. Cl. 364—414 9 Claims



1. A method in reconstruction imaging comprising the steps of:

obtaining data from a subject cross-section of interest;

converting said data in accordance with a reconstruction algorithm to convert said data from a spatial to a spatial frequency domain;

filtering data that has been converted to the spatial frequency domain with a spatial frequency domain filter having an amplitude that increases non linearly with frequency and deviates above and below a linear ramp filter function with deviations from the linear ramp filter function that diminish with frequency; and

converting filtered data back to a spatial domain and back projecting said data over a subject region of interest to provide a mapping of structure within the cross-section of interest.

4,674,046

METHOD AND APPARATUS FOR OBTAINING THREE DIMENSIONAL TOMOGRAPHIC IMAGES BY INTERPOLATION OF A PLURALITY OF PROJECTION SLICE DATA BIND FOR OBTAINING PROJECTION DATA FOR A CHOSEN SLICE

Takeshi Ozeki, and Shinichi Tsubura, both of Ootawara, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 18, 1985, Ser. No. 692,559
Claims priority, application Japan, Jan. 23, 1984, 59-9759
Int. Cl.[4] G06F *15/42*
U.S. Cl. 364—414 15 Claims

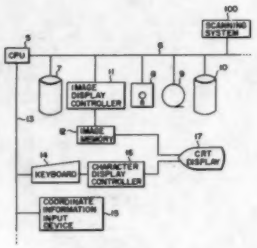
1. A scan planning method for obtaining a tomographic image in a computed tomographic system, comprising:

a first process for acquiring, along different directions, projection data of a plurality of parallel slices of an object to be examined and for reconstructing a tomographic image of each of said plurality of parallel slices;

a second process including interpolating the plurality of tomographic images obtained by the first process and for obtaining three-dimensional image data of a region defined between two outermost slices of said plurality of parallel slices;

a third process for forming and displaying a three-dimensional object image in accordance with said three-dimensional image data obtained by the second process and for changing the viewpoint of said three-dimensional object image in accordance with externally entered first coordinate information;

a fourth process for superposing a slice position image on said three-dimensional object image displayed in the third process, said slice position image representing a slice position, and for changing the position and orientation of said slice on a screen in accordance with externally entered second coordinate information; and



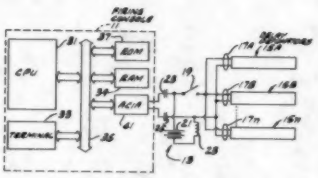
a fifth process for acquiring, along different directions, projection data of said slices corresponding to relative position information between said three-dimensional object image and said slice position image which are obtained in the third and fourth processes, and for reconstructing tomographic images of said respective slices.

4,674,047

INTEGRATED DETONATOR DELAY CIRCUITS AND FIRING CONSOLE

Lawson J. Tyler, and Paul N. Worsey, both of Rolla, Mo., assignors to The Curators of the University of Missouri, Columbia, Mo.

Filed Jan. 31, 1984, Ser. No. 575,324
Int. Cl.[4] F42C *11/06, 17/00;* G06K *5/00;* G06F *15/58*
U.S. Cl. 364—423 46 Claims



25. A detonation system for use with a supply of electrical energy comprising:

user operable firing console means for selectably transmitting unit identification information, firing delay time information and selections from a command set including at least first, second and third commands, and for displaying responses to at least one of the commands; and

a plurality of units of apparatus each comprising in physical association:

an explosure;

means for storing a code identifying the apparatus as a unit, for storing an electrical representation of the firing delay time information supplied from the firing console, for transmitting the stored firing delay time representation to the firing console in response to the first command supplied from the firing console only when the firing console has previously sent unit identification information matching the stored code, for supplying a first signal in response to the second command from the firing console, and for supplying a second signal as soon as a time interval, com-

mencing on the third command from the console, has elapsed, which time interval is substantially equal to the stored firing delay time; and

means for temporarily storing electrical energy from the supply in response to occurrence of the first signal and for transferring stored electrical energy to the explosive thereby the fire the explosive in response to occurrence of the second signal.

4,674,048

MULTIPLE ROBOT CONTROL SYSTEM USING GRID COORDINATE SYSTEM FOR TRACKING AND COMPLETING TRAVEL OVER A MAPPED REGION CONTAINING OBSTRUCTIONS

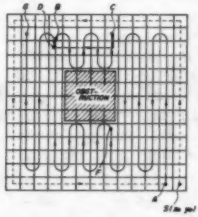
Katsuji Okumura, Chofu, Japan, assignor to Automax Kabushiki-Kaisha, Tokyo, Japan

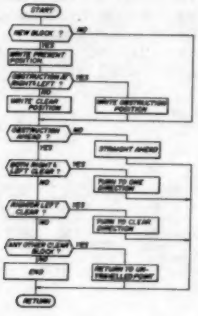
Filed Jan. 4, 1984, Ser. No. 567,978

Claims priority, application Japan, Oct. 26, 1983, 58-200360; Oct. 27, 1983, 58-201652

Int. Cl.[4] G05B *19/42*; G06F *15/50*

U.S. Cl. 364—424 **2 Claims**





1. A control system for a mobile robot for causing the robot to automatically run along a predetermined path, in a selected direction, and at a selected speed by controlling the rotation of right and left drive wheels thereof independently of each other, said control system comprising:

position identification means for sensing the distance travelled by the robot and the change in direction of travel of the robot, calculating the position of the robot in two-dimensional coordinates in response to the sensed distance and the sensed change in direction, and generating a position signal representative of said robot position;

storage means for storing a map consisting of a number of unit blocks which are defined by parallel columns and parallel rows in two-dimensional coordinates;

obstruction sensor means connected to said storage means for sensing an obstruction to generate an obstruction signal, said obstruction sensor means being mounted on a front end and both sides of the robot with respect to an intended direction of travel of the robot;

teaching means for causing the robot to move along the boundary of an area range to be travelled by the robot, so that said area range is stored in the map of the storage means in response to the position signal output from the position identification means;

first operation means connected to said position identification means and said storage means for causing the robot to sequentially move back and forth along the rows and columns by moving along the rows of one of the columns of the map in the area range stored in the map and sequentially shifting to the subsequent row of columns;

second operation means connected to said obstruction sensor means for shifting the robot to one of the next columns in response to detection of an obstruction by said obstruction sensor means by turning the robot at a position where the obstruction is sensed;

non-travelled region discriminating means connected to said storage means for discriminating an initial non-travelled region by reading out the actual travelled region out of the storage means and comparing the actual travelled region with said stored area range as determined by said teaching means;

third operation means connected to said second operation means and to said non-travelled region discriminating means for moving the robot to said initial non-travelled region to cause the robot to initially resume reciprocation along a beginning of said initial non-travelled region, whereby the obstruction sensor means again detects said obstruction such that the robot continues to move along said initial non-travelled region, excluding the area occupied by said obstruction, until said third operation means returns said robot to said beginning of said initial non-travelled region upon the path travelled by the robot reaching the end of said initial non-travelled region; and

end-of-travel discriminating means connected to said storage means for discriminating completion of the travel of the robot after the initial non-travelled region has been travelled upon by the robot and the area range has been travelled upon by the robot except for the obstruction.

2. A control system as claimed in claim 1, further comprising:

deviation means for determining whether the robot is deviated to the right or to the left from the predetermined path, said deviation means comprising determining means for determining whether $d+\tan\theta$ is positive or negative where d is the deviation of the robot from the predetermined path and θ is the angular difference of the travelling direction of the robot from the direction of the predetermined path, and control means for controlling one of the right and left drive wheels to move at a rotation speed $V=V_O-(d+\tan\theta)$ when $d+\tan\theta\geq 0$ and the other of the right and left drive wheels when $d+\tan\theta<0$, where V_O is a reference rotation speed.

4,674,049

AUTOMOTIVE ANTI-SKID BRAKE CONTROL SYSTEM WITH SAMPLING INPUT TIME DATA OF WHEEL SPEED SENSOR SIGNALS

Jun Kubo, Hino, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Apr. 17, 1984, Ser. No. 601,326

Claims priority, application Japan, Apr. 23, 1983, 58-70891

Int. Cl.[4] B60T *8/34*

U.S. Cl. 364—426 **8 Claims**

1. An anti-skid brake control system for an automotive brake system comprising:

a hydraulic brake circuit including a wheel cylinder ror applying braking force to a vehicle wheel;

a pressure control valve disposed within said hydraul brake circuit and operative for increasing fluid pressure in said wheel cylinder in a first position thereof, for decreasing the fluid pressure in the wheel cylinder in a second position thereof and for holding fluid pressure at a constant value in a third position thereof;

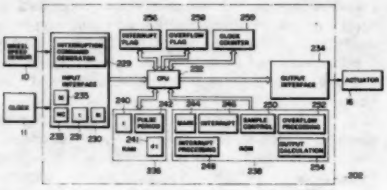
a wheel speed sensor means for producing a sequence of sensor signal pulses separated by intervals representative of the wheel speed;

a timer means for producing timer signals;

a first means, responsive to said sensor signal pulses, for sampling values of said timer signals;

a second means for temporarily storing the sampled timer signal values;

a third means for reading out said stored timer signal values and processing the read-out timer signal values to produce a control signal which actuates said pressure control valve to one of said first, second and third positions so as to adjust the wheel speed toward an optimum relationship with vehicle speed; and



a fourth means responsive to every sensor signal pulses for interrupting operation of said third means to count said sensor signal pulses in a counter until a counter value of said counter reaches a predetermined value which is derived to provide an interval between two sensor signal pulses which is longer than a given period required for accurately deriving a wheel speed, said fourth means enabling said first means for sampling said timer signal values when said counter value reaches said predetermined value and incrementing an interruption counter operative to count interruptions of said third means, which interruption counter is decremented every time said third means completes one cycle of operation, said fourth means operating said third means repeatedly until said interruption counter has a count value of zero.

4,674,050

ANTI-SKID BRAKE CONTROL SYSTEM FOR AUTOMOTIVE VEHICLE

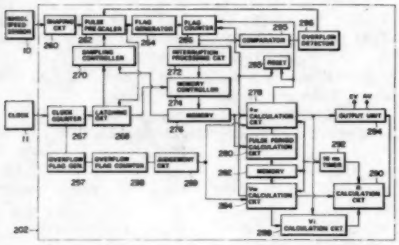
Jun Kubo, Hino, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Apr. 17, 1984, Ser. No. 601,330

Claims priority, application Japan, Apr. 23, 1983, 58-70899

Int. Cl.[4] B60T *8/34*

U.S. Cl. 364—426 **24 Claims**



1. An anti-skid brake control system for an automotive brake system comprising:

a hydraulic brake circuit including a wheel cylinder for applying braking force to a vehicle wheel, said hydraulic circuit further including a pressure control valve for increasing fluid pressure in said wheel cylinder in a first position thereof, for decreasing the fluid pressure in the wheel cylinder in a second position thereof and for holding fluid pressure at constant value in a third position thereof;

a wheel speed sensor for producing sensor signal pulses having a pulse interval variable depending upon wheel rotation speed;

first means for deriving wheel speed based on said sensor signal pulses;

a second means for deriving wheel acceleration, said second means measuring duration of occurrence of a predetermined number of said sensor signal pulses and deriving said wheel acceleration based on successively obtained durations;

third means for deriving a control signal based on the derived wheel speed and the derived wheel acceleration to operate said pressure control valve at one of said first and second positions; and

fourth means for enabling said second means and third means at independent timing relative to each other, said fourth means enabling said second means at a given first, variable timing and said third means at a second, fixed timiing within each successive cycle of anti-skid control, said second timing being independent of said first timing and said fourth means increasing said predetermined number when a difference between pulse intervals is smaller than a predetermined value by a given value, and detecting occurrence of said predetermined number of said sensor signal pulses to enable said second means at said first timing.

4,674,051

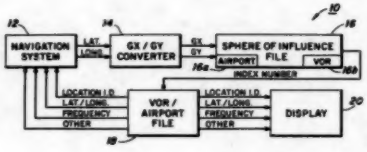
NAVIGATION POINT LOCATING SYSTEM

Michael T. Fischer, Norwalk, Calif., assignor to Sundstrand Data Control, Inc., Redmond, Wash.

Filed May 21, 1985, Ser. No. 736,453

Int. Cl.[4] G01S *5/00;* **G06F** *15/50*

U.S. Cl. 364—443 **16 Claims**



1. A system for automatically determining the closest navigation point to a vehicle and the parameters thereof comprising:

means defining a matrix of geographic areas, each geographic area of the matrix having associated therewith an identifier representing the closest navigation point to said area, said matrix defining means being responsive to signals representative of the geographic position of the vehicle for retrieving the identifier associated with the geographic area in which the vehicle is located and providing a signal representative of said identifier; and

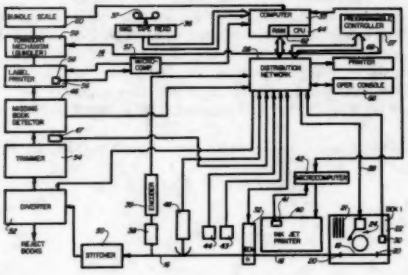
means having stored therein data defining predetermined parameters of a plurality of navigation points, each of said navigation points being identified by one of said identifiers, said storing means being responsive to the identifier representative signal received from said matrix defining means for retrieving the parameters of the navigation point identified by a particular identifier and providing a signal representative of said parameters.

4,674,052

COLLATING AND BINDING SYSTEM AND METHOD WITH POSTAGE INDICATION

Did-Bun Wong, Elmhurst, and Josef K. Lubenow, Chicago, both of Ill., assignors to R. R. Donnelley & Sons Company, Chicago, Ill.

Continuation-in-part of Ser. No. 559,398, Dec. 8, 1983, Pat. No. 4,500,083. This application Nov. 7, 1984, Ser. No. 668,989
Int. Cl.[4] G06F *15/20;* G06G *7/48;* B65H *39/02*
U.S. Cl. 364—466 14 Claims



8. A system for deriving an indication of the postage required to mail items gathered by a gathering system including means for gathering the items in a sequence which permits the items to be assembled into packages so that advantage can be taken of postal discounts, means for detecting a defective item and means for reordering the defective item at a point subsequent to the original point at which the defective item was gathered in the sequence, comprising:

means for developing an indication of an anticipated postal rate for each package if the gathering is accomplished without gathering of defective items and reordering of same;

means coupled to the developing means for counting the actual number of items gathered for each package;

means coupled to the counting means for determining whether the actual number of items equals or exceeds a minimum number of items required to mail the package at the anticipated postal rate; and

means coupled to the determining means for providing an indication of an adjusted postal rate higher than the anticipated postal rate for each package that does not include the minimum number of items.

4,674,053

CONTROL SYSTEM OF INJECTION MOLDING MACHINES

Saburo Bannai, and Kiyoshi Kawashima, both of Numazu, Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 583,327, Feb. 24, 1984, abandoned. This application Sep. 11, 1986, Ser. No. 906,690
Claims priority, application Japan, Feb. 28, 1983, 58-32581
Int. Cl.[4] G06F *15/00;* B29H *5/00*
U.S. Cl. 364—476 9 Claims

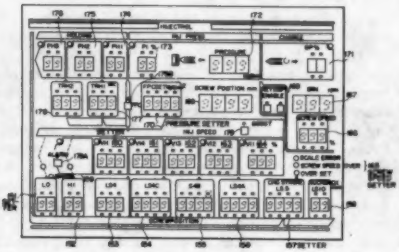
1. A control system for an injection molding machine of the type including a data setting unit for setting molding data corresponding to an injection operation and a mold clamping operation of said injection molding machine, and a control device which in response to data set in said data setting unit forms an instruction signal which controls said injection and mold clamping operations, comprising:

a central processing unit including a main memory region storing said molding data;

display means connected to said central processing unit for displaying the content of said main memory region;

setting means for setting numerical data in said main memory region; and

a data display unit including a plurality of luminous display elements adapted to display said numerical data to a predetermined order of magnitude; a plurality of up/down



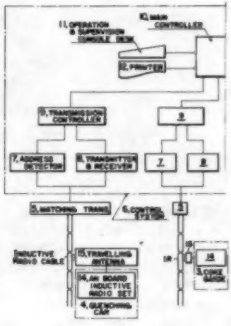
switches, each corresponding to a respective order of magnitude and disposed close to a corresponding luminous display elements; and data setting display means with terminals for connecting signal lines necessary for driving said data display unit to signal lines which detect ON/-OFF states of respective switches.

4,674,054

AUTOMATIC CONTROL METHOD FOR COKE OVEN WORKING MACHINES AND FIXED POSITION CONTROL APPARATUS THEREFOR

Minoru Ikeda, and Yasuyuki Higashigawa, both of Wakayama, Japan, assignors to Sumikin Coke Company Limited, Wakayama, Japan

Continuation of Ser. No. 479,124, Mar. 28, 1983, abandoned. This application Feb. 12, 1986, Ser. No. 828,605
Claims priority, application Japan, Mar. 26, 1982, 57-49812; Mar. 29, 1982, 57-50464; Oct. 26, 1982, 57-188769
Int. Cl.[4] B61L *25/00, 3/00;* G06G *7/70*
U.S. Cl. 364—477 2 Claims



1. An automatic control method for cokery machinery which includes traveling machines that move along associated running paths and a main controller, said traveling machines including a pusher machine, a charging car, a coke guide, and a quenching car, each of said traveling machines having a speed and absolute address along its associated running path and a working condition, said central controller containing a control program for the absolute address and working condition of each traveling machine, said method comprising the steps of:

(a) arranging a transposed-pair-type inductive radio line capable of data transmission over the whole length of each

of the running paths of the traveling machines, each said radio line being composed of phase reference pairs R having no transposition and transposed paired lines G_0 to G_n transposed with different pitches;

(b) designating in binary notation the phases of the signals which are to be received by the respective paired-lines of said transposed-pair-type inductive radio lines such that the portions in phase with the phase reference pairs R are expressed by "0" whereas the portions in opposite phase to the pairs R are expressed by "1", thereby locating the absolute addresses by 2^n over the whole length of the running paths of the respective traveling machines and detecting the absolute addresses of said respective traveling machines at the central controller by means of a continuously position-detecting mechanism which uses an absolute address-detecting method in which the signals received by the paired lines G_0 are phase-shifted to continuously detect the distance from at least one of the points of intersection of transposed pair lines G_0; and

(c) controlling the running, stopping and working operations of said respective traveling machines based on the control programs in said main controller and the speed, absolute address, and working condition of said respective traveling machines.

4,674,055

SOFTWARE VENDING SYSTEM

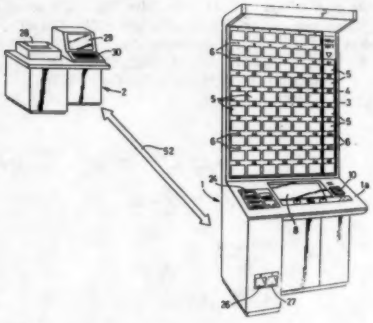
Hirokazu Ogaki; Yasuhiro Funahashi; Hiroshi Koie, and Tomoko Kurachi, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed May 29, 1984, Ser. No. 614,664

Claims priority, application Japan, Jun. 9, 1983, 58-103232; Jun. 9, 1983, 58-103233; Jun. 10, 1983, 58-104742

Int. Cl.[4] G06F *15/21, 15/44*

U.S. Cl. 364—479 **23 Claims**



1. A software vending system comprising:

a host system including primary memory means for storing a plurality of different software programs; and

a plurality of peripheral vending instruments each operatively connected to said host system for interactive data communication therebetween;

each of said plurality of peripheral vending instruments including

selector means for selecting a desired one of said software programs,

secondary memory means for storing the software program which is transferred from said primary memory means and selected by said selector means,

recording means operable to duplicate in a recording medium the selected software program which has been stored in said secondary memory means,

verifying means for verifying a duplicate program recorded in said recording medium, against said selected program stored in said secondary memory means, and

central processing means for inhibiting said recording means from re-duplicating said selected software program in said recording medium when the verification by said verifying means reveals no duplication error, and for permitting said recording means to re-duplicate said selected program in said recorded medium when said verification reveals any duplication error.

4,674,056

PORTABLE BILLING MACHINE

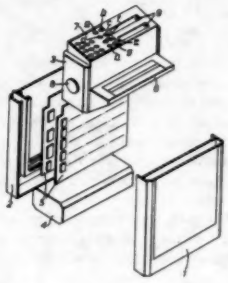
Anthony E. B. Goodfellow, Towcester, England, assignor to Immediate Business Systems Inc., Wymbush, England

Continuation of Ser. No. 694,495, Jan. 25, 1985, abandoned, which is a continuation of Ser. No. 553,414, Nov. 18, 1983, abandoned, which is a continuation of Ser. No. 262,982, May 20, 1981, abandoned, which is a continuation of Ser. No. 72,915, Sep. 6, 1979, abandoned, which is a continuation-in-part of Ser. No. 854,012, Nov. 22, 1977, abandoned. This application Nov. 14, 1985, Ser. No. 797,767

Claims priority, application United Kingdom, Nov. 25, 1976, 49283

Int. Cl.[4] G06F *15/20*; G06K *1/00*

U.S. Cl. 364—483 **4 Claims**



1. A portable utility billing apparatus for enabling a utility meter reader to: (1) obtain information concerning utility meters of a plurality of utility customers on a selected route including current meter value information from those meters that can be read; (2) record the current meter value information; (3) calculate actual customer utility charges for those meters that can be read and estimated customer utility charges for those meters that could not be read; (4) print customer bills with the actual or estimated calculated customer charges thereon; and (5) deliver the bills to selected route customers; said apparatus comprising:

a portable support to be carried by the meter reader;

a mass data storage receiving means mounted on the support for receiving a mass data storage device containing previous meter value information and general customer/meter information and estimated current meter value information;

a numeric display means for visually displaying information to the utility meter reader;

a memory means containing tariff information and a control program;

a data entry means for enabling the utility meter reader to enter the current meter value information;

an arithmetic calculating means for receiving the previous meter value information, the tariff information, the current meter value information and the estimated current meter value information;

a bill printing means for printing a customer bill with the customer charges thereon;

an electrical battery means mounted on the support as a source of electrical energy;

a control means responsive to the control program opera-

tively connected to various means to utilize electrical energy from the electrical battery means for;

(1) reading the general customer meter information from the mass storage device and displaying such general customer/meter information on the numeric display means to assist the meter reader in reading the meters;

(2) entering the current meter value information from the data entry means for those meters that are read and displaying the current meter value information on the numeric display;

(3) writing the current meter value information into the mass data storage device to record the same;

(4) operating the arithmetic calculating means to (a) calculate the actual customer charges for those meters that are read and (b) calculate the estimated customer charges for those meters that are not read;

(5) writing the actual and estimated calculated customer charges into the mass data storage means; and

(6) operating the bill printing means to prepare customer bills with the actual and estimated customer charge printed thereon to enable the meter reader to deliver the printed customer bills to the customers.

4,674,057

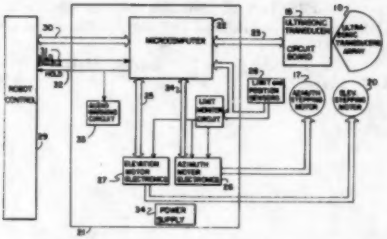
ULTRASONIC RANGING CONTROL SYSTEM FOR INDUSTRIAL ROBOTS

Donald O. Caughman, Marietta, and Wallace J. Plumley, Acworth, both of Ga., assignors to Lockheed Corporation, Calabasas, Calif.

Continuation of Ser. No. 580,064, Feb. 14, 1984, abandoned. This application Mar. 18, 1986, Ser. No. 842,057

Int. Cl.[4] B25J *19/00*

U.S. Cl. 364—513 **6 Claims**



1. An ultrasonic ranging control system for a robot having a movable arm, said system comprising:

(a) an ultrasonic transducer array for transmitting an acoustical pulse and for detecting a reflected echo, said transducer array being mounted proximate to the distal end of the movable arm so as to be arcuately pivotable in both a horizontal and vertical direction, said ultrasonic transducer array including a plurality of ultrasonic transducers arrayed in an angularly manner so as to emulate a single transducer with a wide transmit and receive pattern in substantially the horizontal plane, and each transducer having an individual beam width of approximately 10 degrees to each side, said individual transducers being arranged arcuately about a horizontal plane approximately 20 degrees apart, whereby with a quantity of five such transducers, a horizontal beam width of approximately 100 degrees is attained;

(b) circuit means for measuring the elapsed time between initial transmission and echo detection by said transducer array and for providing an output signal indicative of said elapsed time and for conversion of said elapsed time to a signal representative of distance;

(c) azimuth bi-directional stepping motor for positioning said transducer array horizontally about a vertical axis relative to the distal end of the movable arm independent of and prior to the movement of the arm;

(d) an elevation bi-directional stepping motor for reciprocating said transducer array in an up and down vertical sweep about a horizontal axis relative to the distal end of the movable arm independent of and prior to movement of the arm;

(e) a controller for activating and monitoring said ultrasonic transducer array to provide a command signal when said transducer array senses an unprogrammed obstruction within a predetermined threshold distance in the intended direction of travel of the robot arm and for effecting the control of said azimuth and elevation stepping motors whereby a continual up and down vertical sweep of said transducer array is performed as said transducer array is positioned in the horizontal plane so as to look in the intended direction of travel of the movable arm;

(f) a hold circuit means for receiving said command signal from said controller and for providing a continuous hold signal to the robot arm as long as said transducer array senses the continuing presence of said unprogrammed obstruction within said predetermined threshold distance in the intended direction of travel of the robot arm; and

(g) an end effector means positioned proximate the distal end of the movable arm for performing a predetermined robot work function, said end effector means being separate from and operating independent of said ultrasonic transducer array.

4,674,058

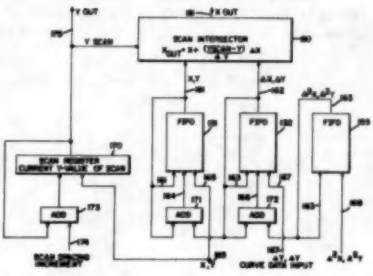
METHOD AND APPARATUS FOR FLEXIGON REPRESENTATION OF A TWO DIMENSIONAL FIGURE

Bruce J. Lindbloom; Peter Mathews, both of Minneapolis, and David S. Yam, Eagan, all of Minn., assignors to Dicomed Corporation, Minneapolis, Minn.

Filed Dec. 7, 1981, Ser. No. 328,108

Int. Cl.[4] G06F *15/626*

U.S. Cl. 364—518 **19 Claims**



1. In a computer aided or generated graphics system, a method of graphical representation of a arbitrary two dimensional shape, comprising the steps of;

providing a set of data points representing the periphery of the shape;

converting said periphery data point set to second sets of data for second or higher order parametric equations which define a plurality of adjoining curves that closely approximate said shape; and

recreating said shape from said second sets of data for presentation on a display medium.

4,674,059

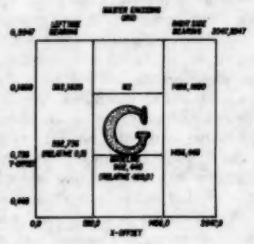
METHOD AND APPARATUS FOR GENERATING A SET OF SIGNALS REPRESENTING A CURVE

Ricky J. Schrieber, Great Neck, N.Y., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Sep. 10, 1984, Ser. No. 649,096

Int. Cl.[4] G06F *15/626, 15/40, 7/00*

U.S. Cl. 364—523 12 Claims



1. A method of encoding and accessing a single data set, in a computer memory, of solution values functionally related to and representing the solution set to at least two domains of a variable, including the steps of:

(a) defining a single data set of solution values functionally related to a first domain of a variable and to a second domain of a variable,

(b) arranging said data set of solution values in an order related to said first domain and said second domain,

(c) accessing said data set of solution values relative to respective values in said first domain to derive at least a part of said solution set to said first domain,

(d) accessing said data set of solution values relative to respective values of said second domain to derive at least a part of said solution set to at least said second domain.

4,674,060

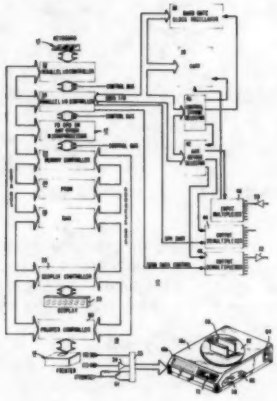
METHOD AND APPARATUS FOR COUNTING CURRENCY AND FOR CONFIRMING THE COUNT OF STRAP CURRENCY

Francis Larkin, Trenton, N.J., and Jeffrey Amey, Levittown, Pa., assignors to Brandt, Inc., Bensalem, Pa.

Filed Jul. 25, 1984, Ser. No. 634,133

Int. Cl.[4] G01G *19/40, 23/00, 23/38;* G06M *21/37*

U.S. Cl. 364—567 21 Claims



1. A method for verifying the accuracy of the count of a previously wrapped bundle of sheets through the use of a computer having a memory and an electronic scale comprising the steps of:

storing predetermined valid upper and lower weight limits in the memory;

weighing said bundle on the scale;

comparing the bundle weight with the valid upper and lower limits for said bundle stored in the memory;

providing an indication when the bundle weight is outside of said valid limits;

storing the bundle weights for a predetermined number of bundles of the desired bundle count in the memory;

disposing of the oldest weight stored when the stored bundle weights reach the maximum number of bundle weights stored in memory;

calculating an average bundle weight from the bundle weights stored in memory;

adding a first factor stored in said memory to the average bundle weight to develop a high valid weight limit;

subtracting a second factor stored in said memory from the average bundle weight to develop a low valid weight; and

storing the low and high valid weights for use in verifying the next strapped bundle of the denomination and quantity.

4,674,061

METHOD AND DEVICE FOR THE AUTOMATIC CALIBRATION OF MEASURING AND INDICATING APPLIANCES FOR THE DETERMINATION OF PARTIAL PRESSURE OF A GAS

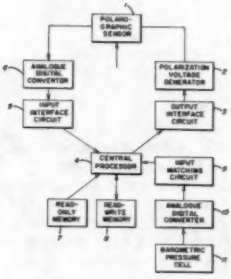
Jörg Diskowski, Freiburg; Wolfgang Jeppel, Umkirch; Hartmut Moisel, Kirchzarten-Burg, and Hans P. Spiess, Umkirch, all of Fed. Rep. of Germany, assignors to Hellige GmbH, Freiburg, Fed. Rep. of Germany

Filed Oct. 12, 1982, Ser. No. 433,856

Claims priority, application Fed. Rep. of Germany, Oct. 14, 1981, 3140875

Int. Cl.[4] G01N *27/28;* G06F *15/46*

U.S. Cl. 364—571 8 Claims



1. A method for the automatic calibration of measuring and indicating appliances for the determination of oxygen partial pressure by means of a sensor, comprising the steps of:

applying a polarization voltage to said sensor, which polarization voltage increases at a constant pre-determined rate from an initial pre-selected value to a maximum, preselected value;

decreasing the polarization voltage applied to said sensor from said maximum value to said initial value at said constant rate;

measuring the current flow in said sensor as it corresponds to each value of the polarization voltage applied thereto;

storing the measured values of the current flow corresponding to the polarization voltages in a read-write memory

thereby forming a voltage-current characteristic polarogram of said sensor;

determining, by forming the polarograms of a multitude of sensors, a representative range of values of current flow relative to polarization voltages in such sensors;

storing said representative range of values of current flow in a read-only memory;

comparing said representative range of values of current flow with said measured value of current flow in a central processor to determine the deviation therebetween;

determining the theoretical residual current deviation of the sensor from the zero value from knowledge of said deviation;

storing the value of the residual current deviation in memory for the purpose of fixing the zero point of the sensor;

setting the operating point of the sensor at the point on the voltage-current characteristic line of the sensor where the rate of change of said voltage-current characteristic line is lowest;

measuring the barometric air pressure of the ambient air; and

extrapolating the theoretical value of the oxygen partial pressure in the ambient air to that at 100% relative humidity.

4,674,062

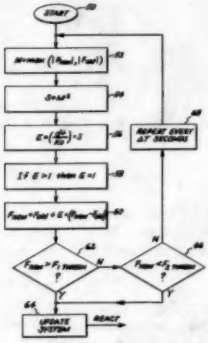
APPARATUS AND METHOD TO INCREASE DYNAMIC RANGE OF DIGITAL MEASUREMENTS

William J. Premerlani, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 20, 1984, Ser. No. 602,290

Int. Cl.[4] G06F *15/46*; G06J *1/00*; H03K *4/02*

U.S. Cl. 364—602 **4 Claims**



1. A method for measuring an analog signal using digital techniques in a manner to increase the dynamic range of digital measurements, comprising:

converting an analog signal to a digital signal representative of said analog signal;

operating on said digital signal to extract a predetermined parameter, (P), representative of a feature of said analog signal, from said digital signal;

generating an output signal (F) from said predetermined parameter (P) such that the relationship between F and P is

$$\tau(P,F)\frac{dF}{dt} + F = P,$$

wherein $\tau(P,F)$ is selected to reduce relative error of small values of said predetermined parameter without reducing transient response to large values of said predetermined parameter.

4,674,063

INFORMATION PROCESSING APPARATUS HAVING A SEQUENCE CONTROL FUNCTION

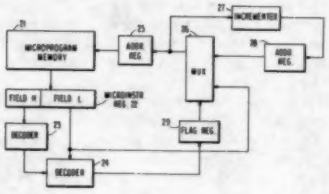
Yoshikuni Sato, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Oct. 18, 1983, Ser. No. 542,969

Claims priority, application Japan, Oct. 18, 1982, 57-182313; Jul. 20, 1983, 58-132311

Int. Cl.[4] G06F *9/42*

U.S. Cl. 364—900 **8 Claims**



1. An information processing apparatus having a sequence control function comprising a memory storing a plurality of instructions including a first type instruction containing an operation code and a control code which designate a jump operation and a second type instruction containing a jump address, a memory access circuit coupled to said memory and applying a first address for reading said first type instruction out of said memory and thereafter applying a second address subsequent to said first address for reading said second type instruction out of said memory, a decoder coupled to said memory and decoding said operation code and said control code in said first type instruction, simultaneously, to generate a jump operation signal according to said control code, and a sequence control circuit coupled to said memory and said decoder and extracting said jump address from said second type instruction which is read out of said memory by said second address, said sequence control circuit applying said jump address to said memory.

4,674,064

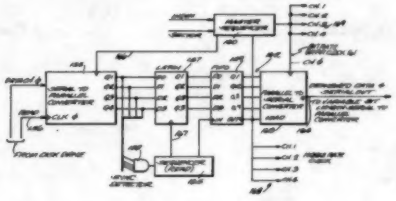
SELECTABLE BIT LENGTH SERIAL-TO-PARALLEL CONVERTER

Steven T. Vaughn, Wales, Wis., assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 6, 1984, Ser. No. 637,841

Int. Cl.[4] G06F *5/00*

U.S. Cl. 364—900 **1 Claim**



1. A programmable serial-to-parallel variable bit length converter having input means for a stream of data bits which have been serialized from parallel bit groups having a predetermined number of significant bits, said converter reforming said continuous series of bits into parallel bit groups having the same predetermined number of significant bits, said converter comprising:

means for storing a digital code word representing the bit length of the digital data parallel bit groups before the bits are converted to a serial bit stream,

decoder means having input means for said code word and a

plurality of output means and said decoder means being operative to produce an enabling signal corresponding to the parallel group bit length indicated by said code word,

shift register means having a plurality of inputs for the least significant bit to the most significant bit for the greatest bit length data group that is intended to be received and having a sequence of parallel outputs,

said shift register means responding to bit rate clock pulses having a rate at which the serialized bits are transmitted and received by shifting bits from a register means input at which they are received repeatedly to a register means output and back to the next register means input and to the next register means output until all of the significant bits composing a group appear in sequence on the outputs of said register means,

the input of said shift register means to which said serial bit stream is routed corresponding to the most significant bit in a group and said input being preceded by inputs and corresponding outputs of said shift register means which all have zero bits on them when input of said stream composing the significant bits of a group starts such that when all of the significant bits are in sequence on the outputs of said register means the significant bits will be preceded by zeros so the total number of parallel bits output from the register will be always the same,

a plurality of gate circuits each having input means for said continuous serial stream of bits and output means coupled respectively to said shift register means inputs, said gate circuits each having an enabling signal input for one of the enabling signals produced by said decoder means and the gate circuit to which the produced enabling signal is input responding by routing said serial bit stream to the input of the shift register which is selected depending on the selected bit length of the group, and

latch means having parallel inputs coupled to the parallel outputs of said shift register means to receive the parallel output bits, said latch means being clocked for latching the parallel output bits from said shift register means at a rate corresponding to the bit length of the digital data group.

4,674,065

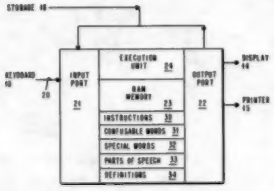
SYSTEM FOR DETECTING AND CORRECTING CONTEXTUAL ERRORS IN A TEXT PROCESSING SYSTEM

Frederick R. Lange, Mt. Airy, and Walter S. Rosenbaum, Bethesda, both of Md., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 373,543, Apr. 30, 1982, abandoned. This application Dec. 10, 1985, Ser. No. 807,769

Int. Cl.[4] G06K *9/00*; G06F *7/28*

U.S. Cl. 364—900 **6 Claims**



1. The method of detecting homophone contextual errors in a string of data segments in an information processing system comprising:

(a) storing a table of homophones, each homophone having stored therewith a set of contextual usage rules specific thereto and at least one of said homophones having stored therewith one or more pointers to a table of other sets of contextual usage rules;

(b) scanning asid string for one of said homophones stored in said table of homophones;

(c) detecting a homophone in said string;

(d) accessing said contextual usage rules and any of said one or more pointers stored with said detected homophone, using said one or more pointers accessing any contextual usage rules in said table of other sets of contextual usage rules associated with said homophone;

(e) comparing data segments surrounding said homophone with said accessed contextual usage rules associated with said homophone; and

(f) indicating to an operator of said information processing system that a homophone has been found whose contextual usage rules do not compare with said data segments surrounding said homophone.

4,674,066

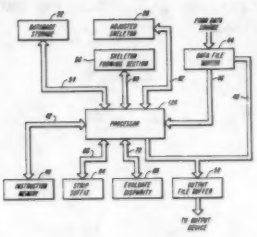
TEXTUAL DATABASE SYSTEM USING SKELETONIZATION AND PHONETIC REPLACEMENT TO RETRIEVE WORDS MATCHING OR SIMILAR TO QUERY WORDS

Henry Kucera, Providence, R.I., assignor to Houghton Mifflin Company, Boston, Mass.

Continuation-in-part of Ser. No. 750,911, Jul. 1, 1985, which is a continuation-in-part of Ser. No. 699,202, Feb. 5, 1985, and a continuation-in-part of Ser. No. 467,834, Feb. 18, 1983. This application Mar. 3, 1986, Ser. No. 835,659

Int. Cl.[4] G06F *5/00, 11/00, 15/00*

U.S. Cl. 364—900 **13 Claims**



8. A method for information retrieval for use with a digital data processing apparatus having database storage means for storing signals representative of plural textual expressions and information pertaining thereto, said method comprising the steps of

A. accepting an input signal representative of a search linguistic expression in conventional textual reoresentation.

B. locating within said database a linguistic exoression matching or similar to said search linguistic expression, said locating step including the steps of converting at least one said database linguistic expression to a linguistically salient word skeleton, and converting said search linguistic expression, or a modified form thereof, to a linguistically salient word skeleton, each said converting step comprising the steps of

i. eliminating from the word skeleton produced thereby a selected alpha set, if any, of the expression being converted which lacks isomorphy with a phonetic representation of that selected set, and

ii replacing with a different linguistic symbol another selected alpha set, if any, of the expression being converted which lacks isomorphy with a phonetic representation of that other selected set,

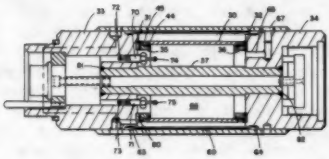
C. generating for outout a signal indicative of the success of locating at least one database linguistic expression matching or similar to said search linguistic expression and generating for outout signals representative of information pertaining to the matching or similar database linguistic expressions, if any.

4,674,067

METHOD AND APPARATUS FOR GENERATING LOW FREQUENCY ACOUSTIC ENERGY WAVES

Joseph Zemanek, Jr., Duncanville, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 10, 1986, Ser. No. 817,641
Int. Cl.[4] G01V *1/00*
U.S. Cl. 367—25 11 Claims



1. An acoustic transmitter for a borehole logging tool, comprising:

(a) a tube of piezoelectric material,

(b) ring members for sealing both ends of said tube,

(c) liquid for filling said tube,

(d) a pliable boot surrounding said tube,

(e) a plurality of passageways between the inside of said tube and the inner surface of said boot which are filled with said liquid, said passageways having (i) diameters that allow the transmission of static pressure changes, but not dynamic pressure changes above a resonant frequency, into said tube, and (ii) combined lengths that control the inertia of the liquid inside said passageways such that said total inertia, in combination with the mass of the liquid encased by said piezoelectric tube, controls the resonant frequency for said piezoelectric tube,

(f) electrical contacts to the inner and outer surfaces of said tube to which differing electrical polarities are applied, and

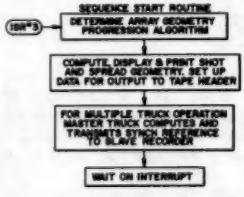
(g) means for modulating the application of said differing electrical polarities to said tube to excite said tube to vibrate, thereby generating an acoustic energy wave in subsurface formations surrounding a borehole in which the borehole logging tool is placed.

4,674,068

METHOD AND APPARATUS ASSOCIATED WITH A MICROCOMPUTER SYSTEM FOR AUTOMATICALLY INDICATING A NEXT-IN-TIME POSITIONAL PARAMETER OF AN EXPLORATION SYSTEM THAT INCLUDES TWO RECORDING TRUCKS

H. T. Carruth, Jr., Anaheim, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jul. 16, 1980, Ser. No. 169,337
Int. Cl.[4] G01N *1/36*
U.S. Cl. 367—77 5 Claims


SEQUENCE START ROUTINE
DETERMINE ARRAY GEOMETRY PROGRESSION ALGORITHM
COMPUTE, DISPLAY & PRINT SHOT AND SPREAD GEOMETRY, SET UP DATA FOR OUTPUT TO TAPE HEADER
FOR MULTIPLE TRUCK OPERATION MASTER TRUCK COMPUTES AND TRANSMITS SYNCH REFERENCE TO SLAVE RECORDER
WAIT ON INTERRUPT

1. Method of automatically generating next-in-time reference positional data for a source-detector array of a second recording truck("slave") commanded by a first recording truck ("master"), said reference data being identified by a multi-bit code representative of at least one of a series of positions along a line of survey, said code being generated by a microcomputer system within said first truck including an MPU, memory units, and display and switching means interconnected via a system bus; said code being transmitted to a microcomputer system in said second truck, comprising,

(a) storing data in said microcomputer system of said first truck, said stored data being at least associated with said series of positions along said line of survey,

(b) at the end of each collection cycle, determining as bits of digital data a next-in-time reference position for said array of said slave truck,

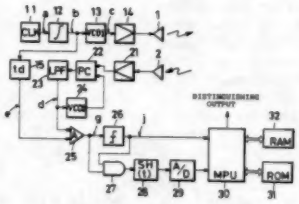
(c) transmitting the data of (b) to said slave truck.

4,674,069

SYSTEM FOR COLLECTING AND PROCESSING DATA RELATING TO MOVING BODIES

Masao Mizuno, Kyoto, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Dec. 16, 1983, Ser. No. 562,181
Claims priority, application Japan, Dec. 16, 1982, 57-221512; Dec. 16, 1982, 57-221513; Dec. 16, 1982, 57-221514; Dec. 16, 1982, 57-221515; Dec. 16, 1982, 57-221516
Int. Cl.[4] G01S *15/34*
U.S. Cl. 367—90 10 Claims



1. A system for collecting and processing data relating to a traveling vehicle comprising:

means for generating an ultrasonic wave signal having its frequency varied continuously and a signal representing the frequency variation of the ultrasonic wave signal,

ultrasonic wave transmitting means disposed above a road surface and adapted to be continuously driven by the ultrasonic wave signal,

ultrasonic wave receiving means disposed above the road surface for receiving return ultrasonic waves including reflected waves from the road surface and the vehicle,

means for frequency-demodulating an output signal from the ultrasonic wave receiving means and deriving a signal representing a frequency variation of the received ultrasonic wave,

means for delaying the signal representing the frequency variation of the ultrasonic wave signal generated by the generating means by a predetermined time interval, and

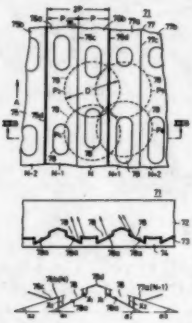
means for producing a signal representing the difference between the delayed signal and the signal representing the frequency variation of the received ultrasonic wave to obtain a signal representing the contour of the vehicle.

4,674,070

OPTICAL TYPE DISC WITH V-SHAPED GROOVE AND OPTICAL TYPE REPRODUCING APPARATUS THEREFOR

Osamu Tajima, Ibaraki, and Shigehiro Ito, Toride, both of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Aug. 8, 1985, Ser. No. 763,905
Claims priority, application Japan, Aug. 11, 1984, 59-167989; Feb. 27, 1985, 60-38150; Feb. 27, 1985, 60-38151
Int. Cl.[4] G11B 7/007
U.S. Cl. 369—46 10 Claims



1. An optical type disc from which recorded information signals are optically reproduced by use of a light beam, said disc comprising:

a main disc body;

a recording surface formed on a surface of said main disc body; and

a V-shaped groove formed spirally on the recording surface of said main disc body, said V-shaped groove consisting of a pair of sloping surfaces,

each sloping surface of said V-shaped groove being recorded with information signals as rows of geometrical depressions or projections,

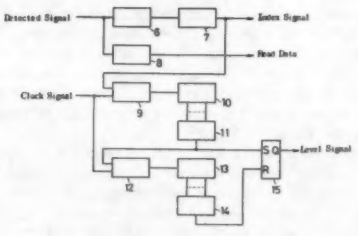
an inclination angle of a bottom surface of the geometrical depression or a top surface of the geometrical projection being greater than an inclination angle of the sloping surface of said V-shaped groove.

4,674,071

DATA RECORDING AREA SIGNAL GENERATING METHOD AND APPARATUS

Masuo Okumura, and Ken Ohshima, both of Tokyo, Japan, assignors to Olympus Optical Company Limited, Tokyo, Japan

Filed Sep. 19, 1984, Ser. No. 652,446
Claims priority, application Japan, Sep. 19, 1983, 58-172634
Int. Cl.[4] G11B 5/09, 20/12
U.S. Cl. 369—48 6 Claims



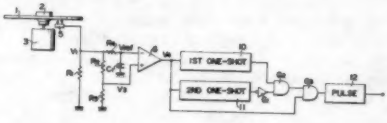
1. A method for recording on a record medium on an accurately defined recording area comprising, developing a detected signal representative of a format for recording on a record medium, developing from the detected signal an index signal representative of a data recording control signal; applying the index signal to a data recording control section of recording circuitry having a first gate and opening the first gate to apply a clock signal to a first counter for developing an output signal therefrom, comparing the first counter output signal with a set value in a first comparator and representative of a start point of a recording area, developing a start-area signal as an output of the first comparator, applying the start-area signal to both a set terminal of an R-S flip-flop having a control signal input and applying the start area signal to a second gate to open the second gate to supply the clock signal to a second counter, the second counter having an output, comparing the second counter output in a second comparator with a value corresponding to the end point of the data storing area and developing an end-area signal as an output of the second comparator, applying the end area signal to a reset terminal of flip-flop thereby to define the point at which recording is controlled by the recording area signal or is inhibited, whereby the record area on a record medium is accurately defined.

4,674,072

INDEX PULSE GENERATOR CAPABLE OF PRODUCING AN INDEX PULSE OF STABILIZED NATURE FOR USE IN OPTICAL INFORMATION RECORDING AND REPRODUCTION SYSTEMS

Mitsugu Sakai, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Sep. 16, 1985, Ser. No. 776,676
Claims priority, application Japan, Sep. 28, 1984, 59-145906[U]
Int. Cl.[4] G11B 27/24
U.S. Cl. 369—52 4 Claims



1. An index pulse generator for an optical information recording and reproducing system in which information is optically recorded or reproduced, comprising

detector means for detecting an index mark applied to a record medium;

a low pass filter through which an output from the detector means is passed to provide a reference signal;

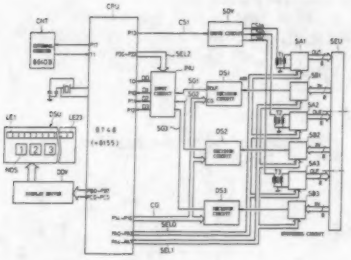
means for comparing an output signal from the detector means against the reference signal to deliver an index pulse; and

a spike noise elimination circuit including a first and a second one-shot multivibrator each of which receives the index pulse, a first AND gate to which an output pulse from the first one-shot multivibrator is directly applied and an output pulse from the second one-shot multivibrator is applied through an inverter, and a second AND gate which receives an output from the first AND gate and the index pulse.

4,674,073
REFLECTIVE OBJECT DETECTING APPARATUS

Yoshihiro Naruse, Tokyo, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Feb. 28, 1986, Ser. No. 835,005
Claims priority, application Japan, Feb. 28, 1985, 60-28337[U]; Mar. 1, 1985, 60-40860
Int. Cl.[4] G01S 15/93
U.S. Cl. 367—105 8 Claims



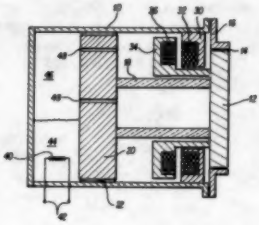
1. A reflective object detecting apparatus comprising:
object detector means including at least three ultrasonic wave generating means and at least three ultrasonic receiving means disposed in a linear array substantially at equal intervals and in alternate relation;
means for energizing the ultrasonic wave generating means;
amplifier means having input and output means for amplifying a signal from the ultrasonic receiving means;
selection means connected to at least one of the input and output means of the amplifier means for simultaneously selecting signals from at least two of the ultrasonic receiving means;
energization selection means connected to the ultrasonic wave generating means for selective energizing simultaneously at least two of the ultrasonic wave generating means;
display means for displaying information relating to the location of and a distance to an object;
and control means for controlling the selection means and the energization selection means, for alternately changing the particular ultrasonic receiving means being selected and changing the particular ultrasonic generating means being selected and for sequentially monitoring signals from the plurality of ultrasonic receiving means in a selective manner so that when a signal exceeds a given level, the control means causes the display means to display information relating to the distance which corresponds to the time of reception from the energization of the ultrasonic wave generating means and also relating to the location of the object corresponds to a particular position of the ultrasonic receiving means which is then selected.

4,674,074
SATURATED VAPOR PRESSURE RELEASE MECHANISM

Oscar W. Schoen, Jr., P.O. Box 408, Organ, N. Mex. 88052

Filed Oct. 23, 1984, Ser. No. 663,787
Int. Cl.[4] H04R 1/44; H05K 5/00
U.S. Cl. 367—172 10 Claims

1. A pressure release mechanism for a transducer, comprising:
a waterproof housing;
a radiating mass mounted at one end of said housing;
a backing mass mounted within said housing;
a transducer element mounted on said radiating mass and said backing mass for applying a displacement to said radiating mass;
a quantity of fluid filling any open space within said housing, said quantity of fluid being partly in the liquid state and partly in the vapor state;
a heating means within said housing in contact with said fluid in the liquid state for adding heat to said fluid in the liquid state and changing said fluid to the vapor state;

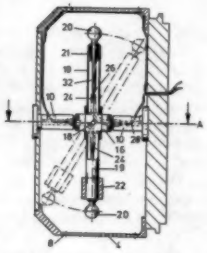


wherein the pressure of said vapor in said housing increases to balance pressure on the transducer external to said housing.

4,674,075
CARDAN SUSPENSION FOR MICROPHONES FOR SOUND RANGING IN WATER

Albert Dietrich, Markdorf; Peter Katz, Friedrichshafen, and Josef Vincken, Weitersburg, all of Fed. Rep. of Germany, assignors to Dornier GmbH, Friedrichshafen, Fed. Rep. of Germany

Filed Sep. 22, 1981, Ser. No. 308,189
Claims priority, application Fed. Rep. of Germany, Sep. 20, 1980, 3035544
Int. Cl.[4] H04R 17/00
U.S. Cl. 367—173 4 Claims



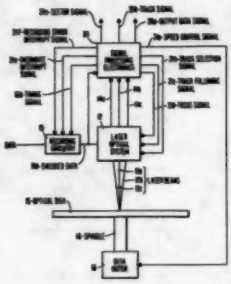
1. A Cardan suspenison hydrophone arrangement, comprising:
a housing;
a Cardan ring attached to and pivotable relative to said housing about a first axis;
a shaft attached to said Cardan ring;
a support tube attached to said shaft for pivotable movement about a second axis that is defined by said shaft and is perpendicular to said first axis;
a pair of microphones respectively disposed on opposite ends of said support tube, said microphones being pivotable about an axis concentric with said support tube; and
a pair of coiled cable, each of said cables being at least partially disposed in said support tube and having one end connected to one of said microphones and an other end operatively connected to transmit signals from said microphone to said housing.

4,674,076

OPTICAL MEMORY SYSTEM HAVING IMPROVED POSITIONING AND FOCUSING CONTROL CIRCUITRY

Der C. Hsieh, Thousand Oaks, and Edward V. LaBudde, Newbury Park, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.

Continuation of Ser. No. 379,980, May 19, 1982, abandoned. This application Aug. 15, 1984, Ser. No. 641,355
The portion of the term of this patent subsequent to May 26, 2004, has been disclaimed.
Int. Cl.[4] G11B 7/095
U.S. Cl. 369—32 9 Claims



1. In an optical data storage system including a recording medium having a large plurality of tracks containing stored data, the combination comprising:

means providing a radiation beam for reading data recorded in a track;

means including a movable focusing means for focusing said beam on said medium;

driving means for controlling the movement of said movable beam focusing means;

focus error detecting means including a plurality of photodetector elements for providing photodetector output signals indicative of the focusing of said beam on said medium;

first signal combining means responsive to said photodetector output signals for providing a focus error signal indicative of beam focus error;

focus error correcting means responsive to said focus error signal for causing said driving means to move said movable beam focusing means so as to substantially maintain said beam in focus on said medium so long as the beam focusing error remains substantially within a predetermined capture range;

second signal combining means responsive to said photodetector output signals for providing an output signal capable of indicating when the beam focusing error changes from being within said capture range to being outside of said capture range; and

capture range return means operative in response to said output signal indicating that the beam focusing error has changed from being within said capture range to being outside of said capture range for causing said driving means to move said movable beam focusing means in a manner such that the beam focusing error is brought back within said capture range;

means providing for relative movement of said radiation beam along said track;

track following means for causing said beam to accurately follow a selected track on said medium; and

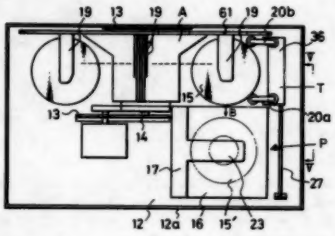
track seeking means for moving said beam from a current track being followed to a new track, said track seeking means including short seek moving means and long seek moving means, said short seek moving means being operative to move said beam when the track-to-track distance over which said beam is to be moved is equal to or less than a predetermined value and said long seek moving means being operative to move said beam when the track-to-track distance over which said beam is to be moved is greater than said predetermined value.

4,674,077

DISC REPRODUCING APPARATUS WITH CAROUSEL USING DISC CLAMPING DEVICE

Shin-ichi Yoshimoto; Reigo Ando; Takeshi Shirai, and Hiroshi Nomura, all of Shirakawa, Japan, assignors to Nippon Columbia Co. Ltd., Tokyo, Japan

Filed Aug. 15, 1984, Ser. No. 641,171
Claims priority, application Japan, Jan. 26, 1984, 59-12898
Int. Cl.[4] G11B 17/28
U.S. Cl. 369—37 5 Claims



1. A disc transport system for selectively supplying discs to a playback apparatus comprising:

a. a carousel carrying a plurality of discs;

b. means for rotating said carousel such that a disc to be selected from said plurality of disc arrives at a predetermined position;

c. transfer means for transferring said selected disc at the predetermined position from said carousel to said playback apparatus and vice-versa; and

d. drive means for driving said transfer means for said carousel to said playback apparatus and vice-versa;

said carousel comprising

a disc-shaped base and a plurality of disc clampers located on said disc-shaped base in a radial direction along a periphery of said base,

each of said disc clampers being formed of a disc support and a clamper member supported by a bearing provided on said disc support and having a convex portion adapted to engage with the bore of said disc,

a spring member for biasing said convex portion of said clamper members engaging the bore of said disc against said disc support, and

an operation member for disengaging said convex portion from the bore of said disc against the bias of said spring member to release said disc from said carousel for transfer to said playback apparatus.

4,674,078

OPTICAL INFORMATION REPRODUCING APPARATUS WITH IMPROVED SKEW ERROR CONTROL

Toru Otsuka, and Tadashi Motoyama, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 21, 1984, Ser. No. 685,128
Claims priority, application Japan, Dec. 29, 1983, 58-247814
Int. Cl.[4] G11B 7/00
U.S. Cl. 369—44 10 Claims

1. An optical information reproducing apparatus for reproducing information recorded on a recording surface on a disc shaped rotating record medium comprising:

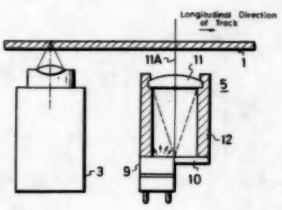
an optical pick-up device having an optical axis and being mounted on a tiltable optical block, said pick-up device having a laser beam source for generating a laser beam directed towards said recording surface along said optical

axis and a photo detector for detecting said beam reflected from said recording surface and for reproducing the recorded information;

means for rotating said record medium;

skew error detector means for detecting a tilt of the record medium at a skew angle relative to said optical pick-up device and for generating a skew error signal having a D.C. component and an A.C. component;

control circuit means supplied with the skew error signal for generating a control signal responsive to the D.C. component of said skew error signal; and



skew error corrector means controlled by the control signal for controlling a position of said optical block so that the optical axis of said pick-up device is maintained perpendicular to the recording surface, wherein said control circuit means includes comparator means for comparing a level of said skew error signal with a threshold level and for generating an output pulse, a width of which corresponds to the D.C. component of the skew error signal, and pulse width discriminator means for detecting the width of said output pulse relative to a reference pulse corresponding to a rotational period of said record medium.

4,674,079

AUTOMATIC DISC LOADING AND UNLOADING MECHANISM FOR RECORD PLAYER APPARATUS

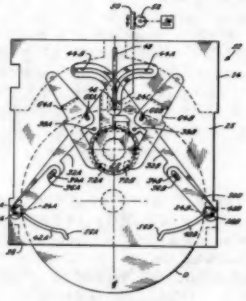
Louis P. C. Agostini, Sint-Pieters Leeuw, Belgium, assignor to Staar S. A., Belgium

Filed Feb. 18, 1986, Ser. No. 829,973

Claims priority, application Belgium, Apr. 23, 1985, 214895

Int. Cl.[4] G11B *17/04, 25/04*

U.S. Cl. 369—77.1 **13 Claims**



1. An automatic loading and unloading mechanism for a slot-type record disc apparatus comprising:

a housing having an upper half and a lower half divided substantially along a disc insertion plane,

a slot defined in a front panel of said housing along said plane for receiving a disc inserted edgewise through said slot along an insertion path in said plane,

drive means including a drive hub for a disc located in said lower half of said housing and adapted to drive a disc when in an operating plane parallel to said insertion plane and displaced therefrom,

loading and unloading means including three conical elements mounted in a mechanically variable triangle arrangement in said housing and having surfaces tapering inwardly in the upward direction and engaging the edge of a disc at an upper portion of said tapering surfaces to hold a disc when the disc is partially inserted into said slot and in a loading position,

means for holding said disc by said conical elements and for moving said disc from said loading position along said insertion path to an intermediate position above said drive hub and perpendicularly relative to said insertion plane to said operating plane on said drive hub including:

means for moving said conical elements edgewise in the direction of said path from a loading triangle arrangement to an intermediate triangle arrangement while coordinating the movement of said conical elements to maintain a geometrically variable triangle with the conical elements in contact at upper portions thereof with different portions of the edge of the disc as the conical elements move edgewise to move said disc to an intermediate position above said drive hub, and for moving said conical elements radially outwardly relative to the center of the disc held by said conical elements while retaining a triangular arrangement causing the edge of said disc to ride downwardly into contact with a lower portion of said tapered surfaces of said conical elements to lower said disc to said operating plane and onto said drive hub, the tapered surfaces of the conical elements moving away from contact with the edge of the disc to allow the disc to be rotated by the drive hub.

4,674,080

DISC LOADING AND UNLOADING APPARATUS FOR USE IN A DISC PLAYER

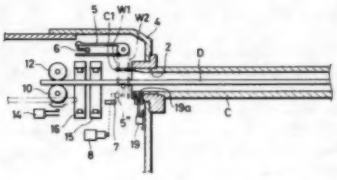
Kunio Higuchi, Kanagawa; Shunichi Miyazono, Chiba, and Tsutomu Toyogucyi, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sep. 24, 1985, Ser. No. 779,635

Claims priority, application Japan, Sep. 29, 1984, 59-204641

Int. Cl.[4] G11B *19/10, 1/00, 17/04, 25/04*

U.S. Cl. 369—77.2 **9 Claims**



1. Apparatus for use in a disc player; comprising:

loading and unloading means for performing selectively a disc loading operation in which a disc inserted into the disc player through an opening for disc insertion is carried to and loaded on a disc rotating device and a disc unloading operation in which the disc is removed from the disc rotating device, returned to said opening, and positioned therein with a portion of said disc protruding through said opening so that said portion is exposed to the outside of the disc player or received within a disc case engaged within said opening;

discrimination means for detecting the presence or absence of a disc case engaged within said opening; and

drive control means responsive to said discrimination means for controlling said loading and unloading means to reload

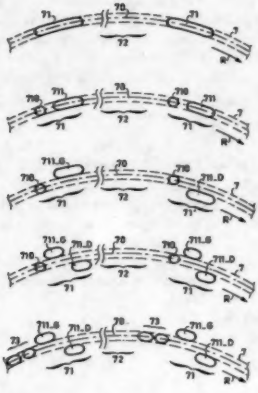
said disc a predetermined time after said disc is positioned in said opening if no disc case is engaged within said opening and to allow said disc to remain indefinitely in said opening if for protection of said disc a disc case is engaged in said opening.

4,674,081

MOBIL PRE-ETCHED DATA CARRIER

Jean L. Gerard, and Claude Bricot, both of Paris, France, assignors to Thomson CSF, Paris, France

Division of Ser. No. 472,995, Mar. 7, 1983, Pat. No. 4,553,228. This application Jul. 22, 1985, Ser. No. 757,148
Claims priority, application France, Mar. 12, 1982, 82 04218
Int. Cl.[4] G11B 7/00
U.S. Cl. 369—275 **9 Claims**



1. A disk shaped data carrier comprising:

at least one optically recordable reference surface wherein prerecorded marking means consisting of non-contiguous marks of uniform radial width are arranged for discontinuously materializing a multiturn track, the adjacent turns of which are separated from each other by intertrack areas of said reference surface;

said multiturn track having in said reference surface a mean axis configurated as a flat curve akin to a sprial and having a pitch in excess of said radial width;

non-continguous data storage areas along siad mean axis being alloted to storage of data in optically readable form whereas all ssid prerecorded marking means are positioned along said mean axis within the gaps between said data storage areas;

each one of said gaps embodying a specified flag pattern wherein said non-contiguous marks secure a unique lengthwise coded mark configuration selectively identifiable from any mark configuration otherwise recorded along said means axis;

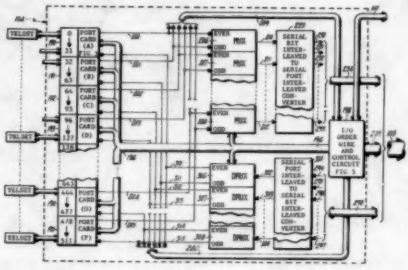
said lengthwise coded mark configuration comprising one of said non-contiguous marks centered in relation with said mean axis.

4,674,082

PBX TELEPHONE SYSTEM I/O INTERFACE

Stephen D. Flanagin, Santa Monica; Howard G. Bubb, Woodland Hills, and John R. Scantlin, Los Angeles, all of Calif., assignors to Telex Computer Products, Inc., Tulsa, Okla.

Continuation of Ser. No. 815,769, Jan. 3, 1986, abandoned, which is a continuation of Ser. No. 738,536, May 24, 1985, abandoned, which is a continuation of Ser. No. 432,882, Oct. 5, 1982, abandoned. This application Oct. 31, 1986, Ser. No. 926,815
Int. Cl.[4] H04J 3/24
U.S. Cl. 370—60 **4 Claims**



1. Input/output (I/O) interface apparatus for use with a time slot interchange (TSI) matrix switch which exchanges serial bit signal packets in each sample frame of a source sample frequency with N number of asynchronous signal sources, at a source line frequency, comprising:

plurality of signal ports, one signal port associated with each signal source, for receiving and transmitting the signal packets between the TSI matrix switch and the associated source;

timing means for providing a clock signal having a clock frequency at least 2 times higher in frequency than the source line frequency and having a clock time period;

program control means, responsive to said clock signal and to each of the n number of sources, for regulating the length of a real time interval between the time of arrival (TOA) and the time of departure (TOD) of the signal packets at each said signal port in dependence on the source line frequency and for regulating the actual TOA and actual TOD of the signal packets at each said port in dependence on said clock frequency; and

signal transfer means responsive to said clock signal and to said actual TOA and said actual TOD of the signal packets at each said port, for exchanging the serial bit signals of each signal packet between each said signal port and the TSI matrix switch at a signal bit line frequency substantially equal to said clock frequency.

4,674,083

TIME DIVISION MULTIPLEXED SWITCHING STRUCTURE FOR PBX

Mark H. Rackin, Dunwoody, Ga., assignor to Solid State Systems, Inc., Marietta, Ga.

Filed Nov. 16, 1984, Ser. No. 672,061
Int. Cl.[4] H04Q 11/04
U.S. Cl. 370—67 **9 Claims**

1. An improved time division multiplexed switching structure comprising in combination:

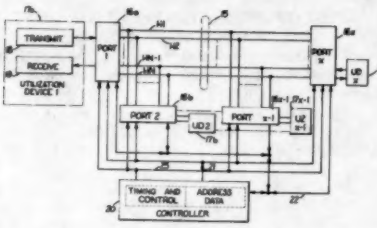
N bidirectional highway lines, N being an integer greater than zero;

framing and clocking means for cyclicly defining M time slots on each of said N highway lines, M being an integer greater than one, and for providing clocking signals;

a plurality of input/output ports connected to said highway

lines, to said framing and clocking means, and to a plurality of utilization devices, each of said input/output ports being capable of transmitting and receiving on a particular one of said highway lines defined by a path select command;

a master controller for providing said path select command to each of said plurality of input/output ports, said path select command defining said particular one of said N



highway lines and a particular one of said M time slots; and

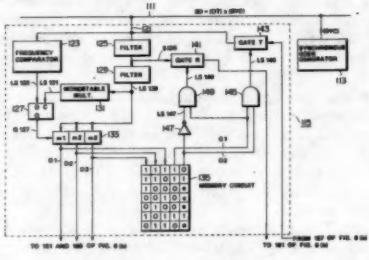
a plurality of access controllers, at least one of said access controllers being connected to each said port and responsive to said path select command and said clocking signals to connect said utilization device to said particular one of said N highway lines defined by said path select command upon each occurrence of said particular one of said M time slots defined by said path select command.

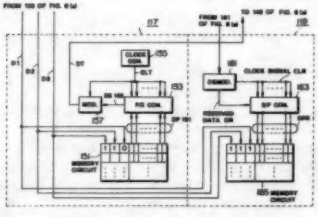
4,674,084

NETWORK SYSTEM

Tadashi Suzuki, Yokohama; Toru Futami, and Atsushi Sakagami, both of Yokosuka, all of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Jul. 25, 1985, Ser. No. 758,796
Claims priority, application Japan, Jul. 27, 1984, 59-156759
Int. Cl.[4] H04J *3/06*
U.S. Cl. 370—85 **9 Claims**





1. A network system, comprising:

(a) a single-wire common signal transmission line for transferring a serial bit data string between a pluality of data stations connected thereto;

(b) first means for generating a synchronization signal and for repeatedly generating an address information bit signal based on a predetermined time series code for each of predetermined synchronization timings in the predetermined time series code, modulating each address information bit signal into a synchronization signal having a frequency which is varied according to a bit status of each address information bit signal, and outputting the modulated synchronization signal to the common signal transmission line so as to superpose on the serial bit data string;

(c) second means provided within each station for demodulating the synchronization signal derived from said first means according to the frequency thereof so as to extract the bit status of the address information bit signal;

(d) third means provided within each station for reproducing a signal corresponding to the predetermined time series code generated in said first means on the basis of the extracted bit status of the address information bit signal;

(e) fourth means for discriminating each bit combination pattern of a predetermined data length from the reproduced signal of said third means; and

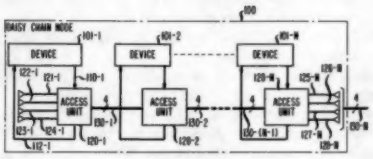
(f) fifth means for determining an operation mode of the station on the basis of each bit combination pattern discriminated by said fourth means.

4,674,085

LOCAL AREA NETWORK

William L. Aranguren, Wayside; Mario A. Restrepo, Ocean, and Michael J. Sidey, Middletown, all of N.J., assignors to American Telephone and Telegraph Co. and AT&T Information Systems Inc., both of Murray Hill, N.J.

Continuation of Ser. No. 714,683, Mar. 21, 1985, abandoned.
This application Oct. 6, 1986, Ser. No. 815,959
Int. Cl.[4] H04J *3/02*
U.S. Cl. 370—85 **22 Claims**



1. A local area network arrangement for providing communications on first and second segmented transmission means among a plurality of devices, each device communicating through a network access means connected to the device and to the first and second segmented transmission means, each network access means including,

transceiver means for translating signals from the device to the first segmented transmission means via first and second ports and for translating signals from the second segmented transmission means via first and second ports to the device,

the first port including input terminal means for connecting the first segmented transmission means thereto, output terminal means for connecting the second segmented transmission means thereto, and means for terminating the first and second segmented transmission means each with a characteristic termination impedance, the terminating means being connected from the input terminal means of the first port to the output terminal means of the first port only in the absence of connection between the segmented transmission means and the first port, and

the second port including input terminal means for connecting the second segmented transmission means

thereto, output terminal means for connecting the first segmented transmission means thereto, and loop back means connected from the input terminal means to the output terminal means of the second port for providing a low impedance electrical path therebetween only in the absence of a connection between the segmented transmission means and the second port,

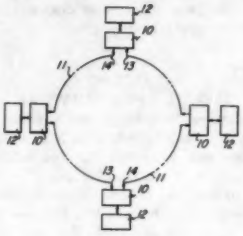
the input and output terminal means of the first port being connected directly to the output and input terminal means, respectively, of the second port, the second port of each network access means adapted for connection via the segmented transmission means to the first port of an adjacent network access means.

4,674,086

TOKEN RING ACCESS CONTROL PROTOCOL CIRCUIT

Andre Szczepanek, Brickhill, and Stephen Hubbins, Kentston, both of England, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 16, 1985, Ser. No. 809,626
Int. Cl.[4] H04J *3/16*
U.S. Cl. 370—86 **13 Claims**



1. A token ring access control protocol circuit having a token/frame transmission path and a processor, said token/-frame transmission path comprising:

a M/T converter for converting input serial data stream to a selected encoding;

an BCLK baud clock signal source derived from an incoming data stream;

means for temporarily serially storing incoming data and detecting incoming tokens/frames, coupled to said BCLK source for clocking the data into and out of said storing means;

data sampling means coupled to said storing means for sampling data bauds and code violation bauds from data bauds of tokens/frames stored therein and for transmitting said data and code violation bauds to said processor;

data modification means coupled to said storing means for reading data bauds out of and writing data bauds into a token/frame, bauds of which are stored in said storing means;

data multiplexing means coupled to said storing means for reading data bauds out of and writing data bauds into a token/frame, bauds of which are stored in said storing means;

data multiplexing means coupled to said storing means for transmitting one of a plurality of inputs therefrom in accordance with control signals from said processor;

fairness means coupled to said path for examining passing tokens and to modify them in accordance with a fairness algorithm in response to release of a token and to control signals from said processor;

wherein said data sampling and modification means are coupled to circuitry for

(i) monitoring passing tokens/frames, recording their status, marking them and deleting them;

(ii) examining the addresses of incoming tokens/frames and copying those with appropriate addresses, signaling the return of transmitted frames to said processor; and

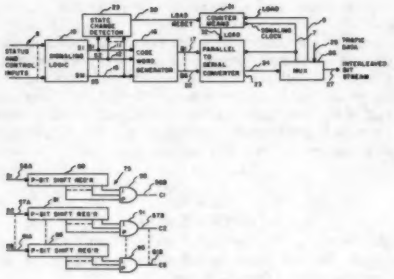
(iii) examining incoming tokens and determining those which can be used to transmit tokens/frames and, in response to control signals from said processor, to transmit tokens.

4,674,087

ASYNCHRONOUS SIGNALING FOR DIGITAL COMMUNICATION CHANNEL

Michael J. Green, and James B. McKay, both of Coquitlam, Canada, assignors to British Columbia Telephone Company, Burnaby, Canada

Filed Jul. 30, 1985, Ser. No. 760,714
Int. Cl.[4] H04J *3/06, 3/12;* **H04L** *7/00*
U.S. Cl. 370—100 **11 Claims**



1. An asynchronous signaling method in a digital communication system including transmitting and receiving equipment for multiplexing and demultiplexing digital traffic information signals and digital signaling information signals comprising the steps of:

defining a plurality of signaling states S1–SM

first selecting a plurality of M unique N-bit primary digital code words Sm1 each defining a different one of the signal states S1–SM and each having N−1 additional ordered permutations of the order of the bits thereof, said additional ordered permutations being designated secondary code words;

second selecting a particular state Ss for transmission;

serially producing bits B1–BN of one of the primary and secondary code words for the selected signaling state Ss at a signaling clock rate;

multiplexing signaling bits with traffic information bits at signaling time slots in a bit stream, said signaling time slots occurring at the signaling clock rate;

transmitting the multiplexed bit stream to receiver equipment;

extracting a signaling clock signal from the multiplexed bit stream in the receiver equipment;

demultiplexing the multiplexed bit stream in the receiver equipment for producing a stream of serial signaling bits;

determining whether the most recently received N signaling bits in the serial signaling bit stream match with one of the N-bit patterns of the primary and secondary code words during each signaling bit interval;

producing during each signaling bit interval a first indication that the selected and transmitted signaling state is a prescribed signaling state Sp when there is a match between the most recently received N signaling bits of the serial

signaling bit stream and one of the N-bit primary and secondary code words associated with the prescribed signaling state Sp; and

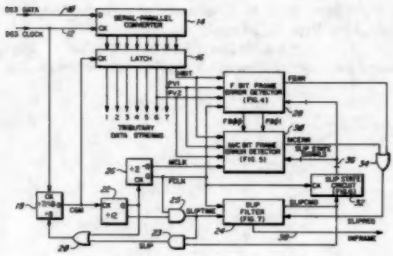
producing during each signaling bit interval a second indication that is the same as the preceding first indication when there is not a match between the most recently received N signaling bits of the serial signaling bit stream and any of the primary and secondary code words.

4,674,088

METHOD AND APPARATUS FOR DETECTING FRAME SYNCHRONIZATION

Wayne D. Grover, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Mar. 7, 1985, Ser. No. 709,636
Int. Cl.[4] H04J *3/06;* **H04L** *7/00*
U.S. Cl. 370—100 **32 Claims**



1. A method of synchronizing to frames of a serial data stream including a predetermined framing pattern, comprising the steps of:

detecting the framing pattern in the data stream;

detecting a predetermined characteristic of data, other than the framing pattern, having a predetermined position in the data stream relative to the framing pattern;

producing an error signal in response to a failure to detect either the framing pattern or said predetermined characteristic in the predetermined position; and

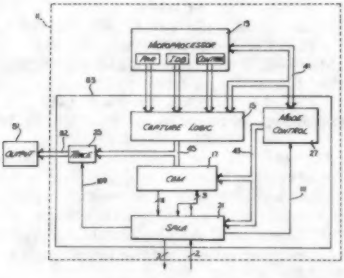
changing the phase of a clock signal relative to the data stream, thereby to produce a synchronizing slip, in dependence upon the error signal.

4,674,089

IN-CIRCUIT EMULATOR

Mark Poret, Mesa, and Jeanne McKinley, Chandler, both of Ariz., assignors to Intel Corporation, Santa Clara, Calif.

Filed Apr. 16, 1985, Ser. No. 723,739
Int. Cl.[4] G01R *31/28;* **G06F** *11/30*
U.S. Cl. 371—25 **11 Claims**



1. An integrated circuit in-circuit emulator for testing a microprocessor system including at least one microprocessor which forms a portion of said integrated circuit comprising:

capture logic means including a plurality of latches coupled to a program counter, internal data bus and control lines disposed within said microprocessor and to an address and data bus of said microprocessor, which latches store the data from said program counter, internal data bus, address and data bus and control lines, each clock cycle of said microprocessor, said capture logic means for storing predetermined data in a memory and comparing said predetermined data with said stored data generated by said microprocessor and generating an output signal whose value depends on the results of said comparison;

comparison means including a content addressable memory and at least one comparator for storing predetermined data in a memory and comparing said predetermined data with said stored data generated by said microprocessor and generating an output signal whose value depends on the results of said comparison;

logic means for receiving said output signal and selectively generating a trace signal and break signal depending upon the value of said output signal, wherein said content addressable memory is coupled to said logic means and stores said predetermined data, and said at least one comparator is coupled to said plurality of latches for comparing at least one of the opcode, program counter address, source address, destination address, address space and data of instructions executed by said microprocessor with a corresponding field of a memory location within said content addressable memory;

means for selectivily enabling said data generated by said microprocessor to be available externally to said integrated circuit depending upon the value of said trace signal; and

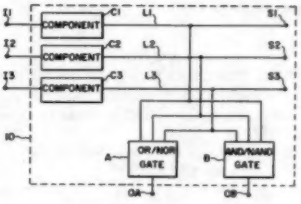
means for controlling the mode of operation of said emulator depending upon the value of said break signal.

4,674,090

METHOD OF USING COMPLEMENTARY LOGIC GATES TO TEST FOR FAULTS IN ELECTRONIC COMPONENTS

Kong-Chen Chen, San Jose, Calif., and Kees Hage, Apeldoorn, Netherlands, assignors to Signetics Corporation, Sunnyvale, Calif.

Filed Jan. 28, 1985, Ser. No. 695,586
Int. Cl.[4] G06F *11/00;* **G01R** *31/28*
U.S. Cl. 371—25 **9 Claims**



1. A method for testing for faults in a group of electronic components each of which provides a digital component signal indicative of the status of that component, wherein a first gate generates a first gate signal that is ideally the logical OR or the logical NOR of the component signals, and wherein a second gate generates a second gate signal that is ideally the logical AND or the logical NAND of the component signals, characterized by the steps of:

monitoring the first and second gate signals upon providing the components with an information pattern that would ideally cause the component signals to all go to logical "0";

monitoring the first and second gate signals upon providing the components with an information pattern that would ideally cause the component signals to all go to logical "1"; and

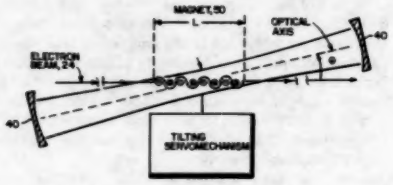
comparing the actual values produced for the first and second gate signals during the monitoring steps with the respective ideal values of the first and second gate signals to ascertain whether any faults exist in the components and gates.

4,674,091

METHODS FOR TUNING FREE ELECTRON LASERS TO MULTIPLE WAVELENGTHS

William B. Colson, Berkeley, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 14, 1985, Ser. No. 765,483
Int. Cl.[4] H01S 3/10
U.S. Cl. 372—20 **9 Claims**



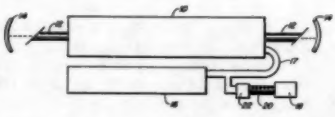
1. In ccmbination with a free electron laser which has a resonator with a resonator axis formed by the mirrors which face each other and have optical waves bouncing back and forth between them along an optical path, linearly polarized magnets producing a transverse, periodic magnetic field which extends into the resonator, and an accelerator which injects a relativistic electron beam along an electron beam path through the transverse, periodic electric field in the resonator to oscillate and amplify the optical waves in a stimulated emission of radiation to produce a coherent and monochromatic laser oscillation at an optical wavelength having a polarization which is the same as that of the transverse magnetic field, the specific improvement comprising a process of tuning the laser oscillation to different wavelengths by a rotation of the resonator axis with respect to the electron beam path and the transverse periodic magnetic field.

4,674,092

MINIATURE CRYOGENIC PUMP METHOD AND APPARATUS FOR ION LASERS

Jeffrey L. Cannon, Sunnyvale, Calif., assignor to Coherent, Inc., Palo Alto, Calif.

Filed Mar. 25, 1985, Ser. No. 715,655
Int. Cl.[4] H01S 3/13
U.S. Cl. 372—33 **17 Claims**



1. An apparatus for reducing gas pressure in a gas tight laser system of the type including a plasma tube which contains a volume of lasing gas at a gas pressure, comprising

molecular sieve material cryogenically cooled to a temperature such that said sieve material traps said lasing gas thereby producing a pumping action which draws said lasing gas from said plasma tube;

means for containing the molecular sieve material;

conduit means connecting the plasma tube and the containing means for permitting communication between the interior of the plasma tube and the interior of the containing means; and

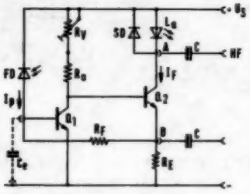
means coupled to the conduit means for regulating communication along the conduit means, wherein the plasma tube, the containing means, the conduit means and the regulating means form an integral structure which is sealed to the atmosphere.

4,674,093

CIRCUIT ARRANGEMENT FOR ACTUATING SEMICONDUCTOR LASERS

Jörg Angerstein, Flein; Elmar Wagner, Heilbronn, and Stefanos Dermitzakis, Heilbronn-Neckargartach, all of Fed. Rep. of Germany, assignors to Telefunken electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Jul. 6, 1984, Ser. No. 623,653
Claims priority, application Fed. Rep. of Germany, Jul. 14, 1983, 3325420
Int. Cl.[4] H01S 3/096
U.S. Cl. 372—38 **20 Claims**



1. A circuit arrangement for actuating and controlling a semiconductor laser constructed to receive a control current and to produce laser radiation having an emitted optical power proportional to the control current, said arrangement comprising: a photodiode optically coupled to receive radiation emitted by the laser and to produce a photoelectric current; and a transimpedance amplifier comprising first and second transistors and having a signal input connected to receive the photoelectric current produced by said photodiode and a signal output for providing an output current directly proportional in magnitude to the photoelectric current, said signal output being connected directly to the laser for supplying the output current as the control current to the laser for causing the control current to the laser to be controlled in a manner to maintain the radiation capacity of the laser substantially constant.

4,674,094

SEMICONDUCTOR LASER WITH AN ACTIVE LAYER HAVING VARYING THICKNESSES

Takashi Murakami, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

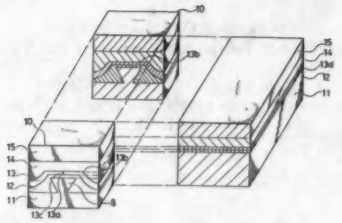
Filed Feb. 7, 1985, Ser. No. 699,442
Claims priority, application Japan, Mar. 12, 1984, 59-48406
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—45 **13 Claims**

1. A semiconductor laser, comprising:

a semiconductor substrate of a first conductivity type having a ridge on a top surface thereof extending in a direction substantially parallel to a directon of a light guide of the laser, said ridge existing only in the neighborhood of a resonator end surface; and

a lower cladding layer of said first conductivity type, an active layer, and an upper cladding layer of a second

conductivity type, produced one after the other on said substrate in the above-mentioned order by a liquid phase growth process such that said active layer has a portion



that is thinner above the ridge than a portion of the active layer that is inside the laser resonator removed from said resonator end surface.

4,674,095

LASER DIODE ARRAY

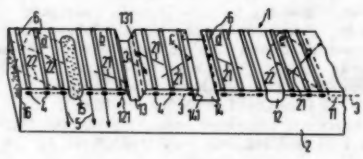
Jochen Heinen, Haar; Franz Kappeler, Puchheim, and Heinz Westermeier, Neubiberg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 15, 1985, Ser. No. 712,138

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1984, 3411314

Int. Cl.[4] H01S *3/19*

U.S. Cl. 372—50 **17 Claims**



1. A laser diode array, comprising:

a plurality of individual laser diode strips disposed substantially in one plane in a semiconductor body, being spaced from one another, and being substantially parallel to one another;

the strips haing a respective optical resonator associated therewith such that a prescribed emission direction of an intended laser radiation emission parallel to a direction of the laser diode strips occurs;

the strips being divided into groups separated by attenuating zone means and with each group having a plurality of said strips, said attenuating zone means attenuating super radiation or oscillatory mode radiation generated within and radiated from the groups and having directions deviating from the prescribed emission direction; and

each group having as a maximum a number of laser diode strips chosen such that the super radiation or oscillatory mode radiation which is present and associated with the group is substantially negligible.

4,674,096

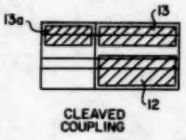
LATERAL COUPLED CAVITY SEMICONDUCTOR LASER

Joseph Salzman; Robert J. Lang, both of Pasadena, and Amnon Yariv, San Marino, all of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Filed Mar. 4, 1985, Ser. No. 707,672

Int. Cl.[4] H01S *3/08, 3/10*

U.S. Cl. 372—50 **8 Claims**



1. A monolithic lateral-coupled laser array comprised of at least two stripe laser cavities of different effective length in close parallel proximity to each other for coupling of radiation therebetween, the longer of said stripe laser cavities being cleaved to provide separate parts, and the parts are cleaved coupled to form one stripe laser cavity lateral coupled to the shorter laser cavity, and separate stripe contact for varying the relative currents supplied to each laser cavity, including the cleaved coupled cavities of the longer of said stripe laser cavities.

4,674,097

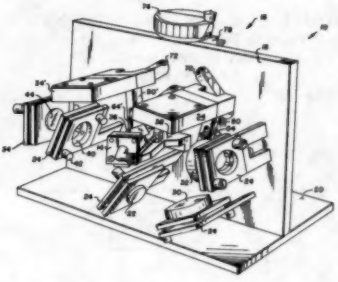
DISTRIBUTED-FEEDBACK DYE LASER

William D. Fountain, Fremont, Calif., assignor to Cooper Lasersonics, Inc., Santa Clara, Calif.

Filed Jan. 14, 1986, Ser. No. 818,717

Int. Cl.[4] H01S *3/20*

U.S. Cl. 372—54 **28 Claims**



1. In a distributed-feedback dye laser having means for generating a pumping beam having an axis of propagation and extending along a path in a known direction and a dye cell having a region impingeable by said pumping beam for lasing, a pumping-beam controller comprising:

a mirror disposable in the path of a beam produced by said generating means, for reflecting an incident beam such that the reflected beam impinges a portion of the dye-cell region; and

means for adjusting the position of said mirror along the incident pumping beam path and for varying the annular orientation of said mirror relative to the incident beam path such that said mirror directs the resulting reflected beam toward the dye-cell region in a manner impinging substantially the same portion of the region for the positions of adjustment of said mirror along the path.

4,674,098

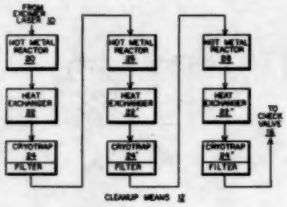
PROVIDING OF GASES FOR AN EXCIMER LASER

Robert Turner, P.O. Box 539, St. James, N.Y. 11780

Continuation-in-part of Ser. No. 605,772, May 1, 1984. This application May 31, 1985, Ser. No. 740,024

Int. Cl.[4] H01S 3/22

U.S. Cl. 372—59 20 Claims



1. In a method for reducing the expenditure of a heavy rare gas in an excimer laser system utilizing in a laser chamber a lasing mixture of a diluent rare gas, a heavy rare gas and a halogen gas in given percentages which includes the steps of continuously evacuating the lasing mixture from the laser chamber, removing from the evacuated lasing mixture any halogen compounds formed by lasing action in the laser chamber to provide a cleansed lasing mixture and feeding the cleansed lasing mixture back into the laser chamber, the improvement comprising adding to the fed back cleansed lasing mixture a supplemental lasing material comprising a gas mixture of the diluent rare gas, the heavy rare gas and the halogen gas, the percentage of halogen gas in the range of 3% to 15%, the percentage of diluent rare gas in the range of 60% to 97% and the percentage of heavy rare gas in the range of 0.3% to 25% of the mixture but with the percentages of the diluent rare gas to heavy rare gas being in substantially the same ratio of said given percentages of said rare gases.

4,674,099

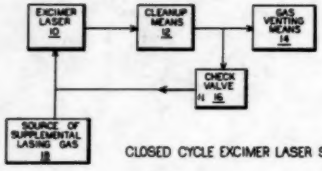
RECYCLING OF GASES FOR AN EXCIMER LASER

Robert E. Turner, 60 Prospect St., Huntington, N.Y. 11743

Filed May 1, 1984, Ser. No. 605,772

Int. Cl.[4] H01S 3/22

U.S. Cl. 372—59 20 Claims



CLOSED CYCLE EXCIMER LASER SYSTEM

1. In an excimer laser system utilizing in a laser chamber a lasing material of a first mixture of a diluent rare gas in concentrations of the order of 95%, a heavy rare gas in concentrations of the order of 2-5 percent and a halogen gas in concentrations of the order of 10ths of of a percent the method of reducing the expenditure of the rare gas comprising the steps of continuously evacuating the lasing mixture from the laser chamber, removing from the evacuated lasing mixture any halogen compounds to provide a cleaned lasing mixture, feeding the cleaned lasing mixture into the lasing chamber the improvement comprising, adding to the lasing mixture a supplemental lasing material comprising a second mixture of the halogen gas, the diluent gas and the heavy rare gas, the percentage of halogen gas being substantially greater than 10ths of a percent and the percentage of the diluent gas and the heavy rare gas having substantially the same percentage ratios as in said first mixture of the lasing material and venting the gas mixture whenever the gas pressure exceeds a given gas pressure.

4,674,100

BISTABLE OPTICAL DEVICE

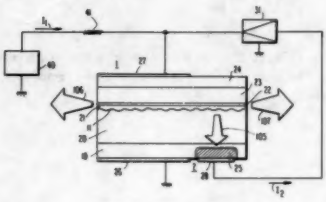
Kohroh Kobayashi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Oct. 5, 1984, Ser. No. 658,008

Claims priority, application Japan, Oct. 6, 1983, 58-187314

Int. Cl.[4] H01S 3/19

U.S. Cl. 372—96 5 Claims



1. A bistable optical device comprising a semiconductor laser having first and second output ports at end facets thereof and a built-in Bragg diffraction grating of second order or higher for providing a third output port, a photodector positioned to receive light diffracted normal to said grating to thereby produce an electric output in response to said light diffracted normal to said grating, and means for feeding back the electric output of the photodetector to the semiconductor laser, said device thereby having bistable states depending upon the excitation of said laser.

4,674,101

ARC-HEATING TYPE EXTRA-FURNACE REFINING APPARATUS

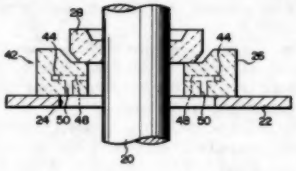
Kazuhiko Matsuo; Teruyuki Hasegawa, both of Yokohama; Seigo Kuwano, Tokyo; Ryuji Yamaguchi, Yokohama; Akio Shiwata, Fukuyama; Yoneichi Hamada, Fukuyama; Yoshimi Komatsu, Fukuyama; Tsuneo Kondo, Fukuyama; Yusuke Shirotani, Fukuyama; Hirohisa Nakashima, Fukuyama, and Yasuhiro Matsuda, Hiroshima, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 1, 1985, Ser. No. 782,525

Claims priority, application Japan, Oct. 12, 1984, 59-213338; Feb. 28, 1985, 60-39342; Mar. 14, 1985, 60-50943; Apr. 23, 1985, 60-85432

Int. Cl.[4] H05B 7/10

U.S. Cl. 373—95 5 Claims



1. An arc-heating type extra-furnace refining apparatus comprising:

a ladle capable of receiving molten steel therein;

a rod-like electrode adapted to be immersed into slag on molten steel within the ladle so as to form an arc between the electrode and the molten steel;

a covering over the ladle having insertion holes accommodating the electrode therein;

sealing means disposed on the insertion holes and having a first sealing member slidably fitted onto the electrode in the longitudinal direction thereof and a second sealing member disposed in such a manner as to hermetically seal both the first sealing member and the ladle covering and provide a gap between the second sealing member and the electrode;

the second sealing member having an inclined gas injection nozzle formed in the second sealing member and aligned to discharge a jet of gas in a direction inclined at an angle of at least 10° away from a plane which includes the axis of the electrode, whereby the gas in injected from the inclined gas injection nozzle to form a flow rotating around the electrode; and

gas supplying means for supplying a gas to the inclined gas injection nozzle for discharge therefrom at a rate of at least 100 Nm^3/hour.

4,674,102

ELECTRIC ARC FURNACE

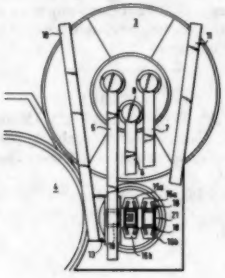
Joachim Ehle, Lautenbach, Fed. Rep. of Germany, assignor to Fuchs Systemtechnik GmbH, Willstätt-Legelshurst, Fed. Rep. of Germany

Filed Jun. 13, 1986, Ser. No. 874,134

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1985, 3522559

Int. Cl.⁴ H05B *7/10*

U.S. Cl. 373—98 **6 Claims**



1. An electric arc furnace comprising a plurality of and in particular three electrode support arms, a plurality of and in particular three lift columns, each support arm being secured to a respective lift column, upper and lower roller guides comprising rollers for substantially vertically guiding a respective lift column, said lift columns being arranged in side-by-side relationship in a row and are provided, both on the side which is towards a cover of the furnace and on the side which is remote from the furnace cover, with respective pluralities of tracks for the rollers of the roller guides, a cover carrier mechanism, and a portal structure which is arranged beside the furnace and which is pivotable about a vertical axis, rollers for mounting said portal structure, said portal structure carrying the cover carrier mechanism and the roller guides for the lift columns, characterized in that two tracks are provided on each of said sides of each lift column, said tracks having surfaces including an angle (α) which is smaller than 180° as viewed from the associated roller guides, and said portal structure being mounted on a roller-type turntable which surrounds the lift columns.

4,674,103

METHOD AND ARRANGEMENT FOR DETECTING THE PRESENCE OF A TRAINING SIGNAL IN A MODEM RECEIVER

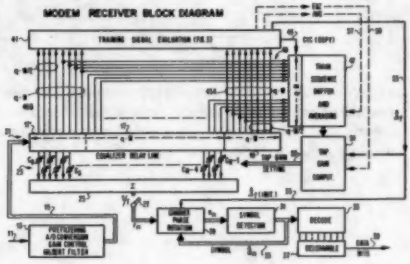
Pierre R. Chevillat, Kilchberg; Dietrich G. Maiwald, Wadenswil, and Gottfried Ungerboeck, Langau a.Albis, all of Switzerland, assignors to International Business Machines Corp., Armonk, N.Y.

Filed Jul. 22, 1986, Ser. No. 888,295

Claims priority, application European Pat. Off., Aug. 28, 1985, 85110807

Int. Cl.⁴ H03H *7/30;* **H03K** *5/159*

U.S. Cl. 375—13 **13 Claims**



1. Method of detecting the presence of a periodic training signal in a modem receiver, characterized by the following steps:

storing a sequence of the received training signal comprising q·(M+W) samples, where M is the period of the training signal and W is a predetermined window size, both represented as number of symbol intervals T, and q is a sampling factor representing the number of signal samples taken per symbol interval T;

determining from two windows comprising two sets of q·W samples and being offset against each other by q·M samples, a metric (z_3) in response to the energy contained in the two sample sets and in response to the correlation between the two sample sets, said metric representing the dissimilarity between the two sample sets except for a dissimilarity which is solely due to a carrier frequency offset of the received training signal; and

comparing said metric (z_3) against a predetermined threshold value, for generating a signal (CYC) indicating the presence of a training signal sequence when the metric falls below said threshold value.

4,674,104

CIRCUIT ARRANGEMENT FOR THE REGULATION OF A MULTICHANNEL PULSE COMPRESSION SYSTEM

Rolf Bächtiger, Oberwil, Switzerland, assignor to Siemens-Albis Aktiengesellschaft, Zurich, Switzerland

Filed Feb. 19, 1986, Ser. No. 830,765

Claims priority, application Switzerland, Feb. 28, 1985, 919/85

Int. Cl.⁴ H04L *27/00*

U.S. Cl. 375—37 **4 Claims**

1. A circuit arrangement for regulating a multi-channel pulse system, comprising:

a transmitter stage comprising:

an antenna;

a pulse modulator, an expansion filter and a power amplifier connected to form a series circuit for receiving and modulating an unmodulated signal to form a pulse-modulated signal and providing said pulse-modulated signal at said antenna;

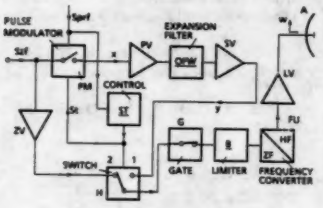
said pulse modulator having an input;

said expansion filter having an output;

a high frequency switch connected in circuit between said

input and said output for forming an unmodulated transmission signal from said unmodulated signal; and

a control stage for generating a control signal for selectively enabling and inhibiting said pulse modulator and said high



frequency switch such that a predetermined number of modulated transmission pulses are transmitted and subsequently said unmodulated transmission signal is provided at said antenna for transmission.

4,674,105

DIGITAL SIGNAL PROCESSOR

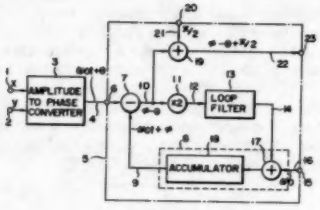
Hideo Suzuki, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 26, 1985, Ser. No. 705,530

Claims priority, application Japan, Mar. 2, 1984, 59-40102

Int. Cl.[4] H04L *27/22*

U.S. Cl. 375—80 **13 Claims**



1. A digital signal processor comprising:

amplitude-to-phase converting means which receives two modulated digital input signal series that are respectively expressed by a plurality of bits and that have a quadrature relation and which outputs a digital phase information signal corresponding to a combination of digital values of said input signal series, said digital values being amplitude information;

means for generating a digital reference signal;

means for generating, as a digital signal, a phase difference signal indicative of the difference between the phase information which is given due to said digital reference signal and the phase information which is given due to the phase information signal which is outputted from said amplitude-to-phase converting means;

means for outputting a demodulation signal on the basis of said phase difference signal; and

means for controlling said reference signal on the basis of said phase difference signal.

4,674,106

MECHANICAL COUNTER HAVING A DIGITAL DISPLAY

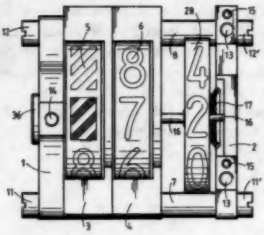
Philippe Bonello, Grand-Saconnex, Switzerland, assignor to Sarcem S.A., Meyrin, Switzerland

Filed Aug. 26, 1985, Ser. No. 769,068

Claims priority, application Switzerland, Sep. 26, 1984, 04609/84

Int. Cl.[4] G06M *1/02*

U.S. Cl. 377—82 **4 Claims**



1. Digital mechanical counter comprising a plurality of coaxial rotative display drums pivoted on a frame, said drums being linked by gear means producing a predetermined ratio between the number of turns of each drum with respect to the others, said frame comprising two end parts and a plurality of intermediate parts each housing one of said drums and having a peripheral aperture through which a portion of the corresponding drum can be seen; autolubricating bearings carried by said intermediate parts for pivotally mounting the drums, and pinions meshing with gear wheels fast with neighboring drums; said end parts and said intermediate parts being applied against each other by means of at least two tightening means at each of said end parts and passing through corresponding openings provided in all said parts.

4,674,107

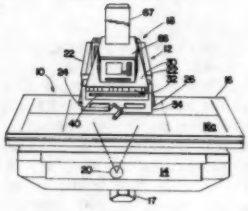
DISPLAY FOR RADIATION IMAGING

Carol A. Urban, Euclid, and Mangala A. Morey, Cleveland Heights, both of Ohio, assignors to Picker International, Inc., Cleveland, Ohio

Filed Jul. 31, 1985, Ser. No. 761,054

Int. Cl.[4] H05G *1/64*

U.S. Cl. 378—98 **19 Claims**



10. A method of maintaining the predetermined spatial orientation of an image of a subject produced on a display and utilizing a subject support member mounted for pivotal motion to a main support frame, a source for propagating penetrative radiation along a path directed toward said support member, a sensor spaced from said source and interposable in said path on a side of said support member opposite said source, said sensor including means to produce electrical signals representing radiation when incident on said sensor and a display mounted to the support member for movement in unison with the sup-

port member and responsive to the radiation representing electrical signals, said method comprising the steps of:

(a) actuating the source of penetrative radiation to irradiate a subject under examination;

(b) sensing radiation emergent from the subject under examination;

(c) producing electrical signals representing sensed radiation;

(d) displaying the radiation representing signals as a visual image;

(e) causing pivotal motion of the support member so as to cause like motion of the display; and

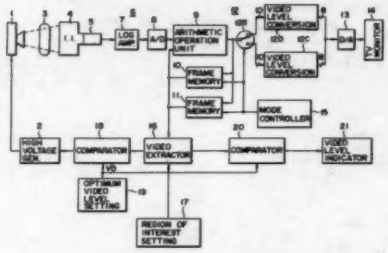
(f) rotating the displayed image as a function of the direction and extend of pivotal motion.

4,674,108

DIGITAL X-RAY MEDICAL DIAGNOSTIC APPARATUS

Hiroshi Asahina, Tochigi, and Ichiro Ogura, Ootawara, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 2, 1985, Ser. No. 751,131
Claims priority, application Japan, Jul. 3, 1984, 59-137820
Int. Cl.[4] H05G 1/64
U.S. Cl. 378—99 **5 Claims**



1. A digital X-ray diagnostic apparatus comprising:

an X-ray photographic device including an X-ray tube for directing X-rays to an object, an image intensifier for converting an image formed by X-rays transmitted through the object into a visible light image, and a television camera for transforming the light image into an analog video signal;

a digital image processing unit including,

analog-to-to digital converting means for converting said analog video signal into a digital video signal,

digital memory means for storing said digital video signal,

digital-to-analog converting means for converting said digital video signal read out from said digital memory means into an analog video monitor signal, and

video signal level converting means for converting the level of said digital video signal to a maximum brightness level of said television camera when said digital video signal is outside of a predetermined reference range governed by the operating range characteristics of said television camera; and

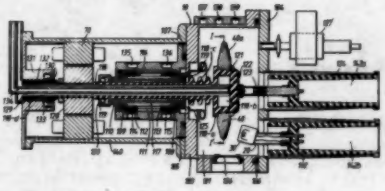
an image display device for visually displaying the analog video monitor signal from said digital image processsing unit.

4,674,109

ROTATING ANODE X-RAY TUBE DEVICE

Katsuhiro Ono, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 26, 1985, Ser. No. 780,176
Claims priority, application Japan, Sep. 29, 1984, 59-204808; Dec. 25, 1984, 59-278428
Int. Cl.[4] H01J 35/10
U.S. Cl. 378—130 **9 Claims**



1. A rotating anode X-ray tube device comprising:

a vacuum vessel;

cathode means arranged in said vacuum vessel for emitting electrons;

a rotatable anode target positioned in said vacuum vessel and facing said cathode means;

an electrically insulating target support section supporting said anode target and having an internal coolant chamber with walls;

a rotating shaft rotatably coupled with said target support section and having internal coolant channels for permitting coolant to flow into and out of said coolant chamber, said coolant channels having means for supplying coolant to said walls of said internal coolant chamber whereby said target is cooled via said chamber;

a cylindrical bearing section fixed to said vacuum vessel, said rotating shaft passing through said bearing section;

a cylindrical shaft housing positioned inside said cylindrical bearing section and vacuum-tightly fixed on said rotating shaft, said shaft housing including means for shielding heat transmission from said rotating shaft;

mechanical bearings interposed between said cylindrical bearing section and said cylindrical shaft housing;

magnetic fluid seal means for vacuum-tightly sealing said vacuum vessel, said fluid seal means being interposed between said cylindrical bearing section and said cylindrical shaft housing;

first potential supplying means for supplying a high positive voltage from the outside to said target;

second potential supplying means for supplying a high negative potential to said cathode means; and

potential maintainin means for maintaining the vacuum vessel at an intermediate potential.

4,674,110

HAND AND FINGER X-RAY POSITIONING DEVICE

Richard G. Eaton, 640 Ely Ave., Pelham Manor, N.Y. 10803, and John J. Keyser, 2 Crest Acre Ct., Summit, N.J. 07901

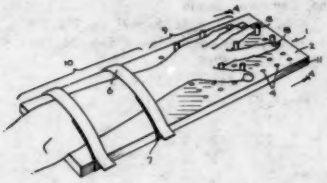
Filed Dec. 14, 1984, Ser. No. 681,689
Int. Cl.[4] H05G 1/00
U.S. Cl. 378—208 **9 Claims**

1. A hand and finger X-ray positioning device comprising:

(a) a radiolucent support board having a plurality of attachment means for securing an arm to said board which is suitable for taking an X-ray of the hand and fingers when placed thereon;

(b) a plurality of positioning pegs for positioning individual fingers which are removably affixed to said attachment means and which permit the stable positioning of the hand and one or more fingers in a desired position for the pur-

pose of obtaining X-rays of at least one of the hand and one or more fingers; and



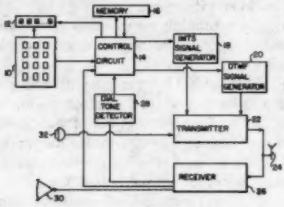
(c) wherein said positioning pegs are substantially perpendicular to said support board.

4,674,111

METHOD AND APPARATUS FOR AUTOMATIC DIALING IN MOBILE RADIO TELEPHONE SYSTEMS

Paul E. Monet, Manlius, and Yves Dufresne, Webster, both of N.Y., assignors to Harris Corporation, Melbourne, Fla.

Filed Sep. 18, 1984, Ser. No. 651,712
Int. Cl.[4] H04M *11/00*
U.S. Cl. 379—58 **14 Claims**



1. A method of recording a plurality of telephone dialing signals, comprising the steps of:

(a) providing a first memory means having a plurality of sequential memory units;

(b) providing a second memory means;

(c) receiving a first signal representing an address of a plurality of telephone dialing signals;

(d) receiving a second signal representing the plurality of telephone dialing signals;

(e) recording the second signal in the first unused memory unit of the first memory means;

(f) determining the address of the second signal as recorded within the first memory means; and

(g) recording in said second memory means the first signal and the address of the recorded second signal within the first memory means.

4,674,112

CHARACTER PATTERN RECOGNITION AND COMMUNICATIONS APPARATUS

George V. Kondraske, Arlington, and Adnan Shennib, Lake Jackson, both of Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Filed Sep. 6, 1985, Ser. No. 773,371
Int. Cl.[4] H04M *11/00*
U.S. Cl. 379—96 **14 Claims**

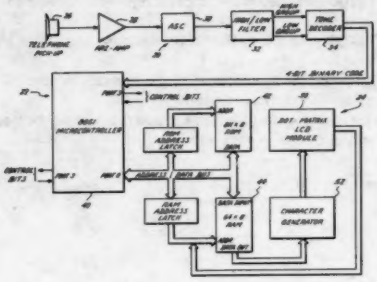
10. A method of communicating, utilizing a signal-generating keyboard where at least some of the keys represent two or more alphabetic characters, comprising the steps of:

inputting a word into said keyboard by depressing a single key for each alphabetic character of said word;

transmitting signals generated by the key depressions;

receiving said transmitted signals and decoding the signals into binary code;

matching said binary code with one or more pre-programmed codes, each pre-programmed code being representative of a syllabic element;



Forming a representation of the word from the one or more syllabic elements represented by the matched one or more pre-programmed codes; and

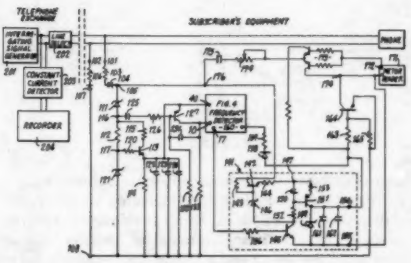
outputting the word representation in a form perceptible to the user.

4,674,113

FREQUENCY RESPONSIVE APPARATUS FOR READING A METER OVER A TELEPHONE LINE

William J. Brennan, Jr., Montgomery, and Charles A. Cottle, Tallassee, both of Ala., assignors to Neptune Water Meter Company, Tallahassee, Ala.

Filed Sep. 28, 1984, Ser. No. 655,712
Int. Cl.[4] H04M *11/06*
U.S. Cl. 379—107 **5 Claims**



1. Apparatus for reading stored data over a telephone line, including:

a. means for detecting a reversal of the normal polarity between the conductors of said telephone lines;

b. frequency detecting means for detecting a signal whose frequency is within a predetermined range;

c. means responsive to the detection of said reverse polarity to supply energy to said frequency detecting means;

d. means responsive to the detection of a signal whose frequency is within said predetermined range by said frequency detecting means to establish a constant current flow on the telephone line;

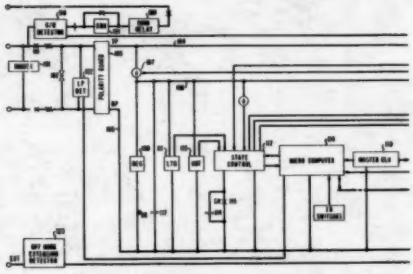
e. means for translating said stored data into pulses transmittable over the telephone line; and

f. means for activating said translating means in response to said constant current flow to transmit said pulses over the telephone line.

4,674,114
FRAUD PREVENTION IN AN ELECTRONIC COIN TELEPHONE SET

Paul E. Crouch, Freehold, N.J.; Joseph J. Nahas, Wyomissing Hills, Pa., and Howard Ng, Old Bridge, N.J., assignors to AT&T Technologies Inc. and AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 567,053, Dec. 30, 1983. This application Jul. 7, 1986, Ser. No. 882,348
Int. Cl.[4] H04M *17/00*
U.S. Cl. 379—154 14 Claims



1. In a coin telephone station, an arrangement for preventing fraudulent coin tones from being provided to a central office over a coin subscriber loop, the arrangement comprising:

a first and a second transmission channel for connecting a transmitter to the central office, the arrangement selectively connecting one or the other of the channels to the central office;

fraud filter means being disposed in the second transmission channel for attenuating a frequency component in signals originating at the transmitter and indicative of coin deposits; and

switching means for selecting between the first and second transmission channel, the switching means being operably responsive to a control signal from the central office reflecting that the deposit of coins in the telephone station is required, the switching means selecting the first channel in the absence of the control signal and the second channel during receipt of the control signal.

4,674,115
PROGRAMMABLE TELEPHONE SWITCHER

David L. Kaleita, Sterling Heights; James A. Zboralski, Clawson, and Darryl A. Hock, Harper Woods, all of Mich., assignors to Jabil Circuit Company, Madison Heights, Mich.

Filed Sep. 20, 1985, Ser. No. 778,540
Int. Cl.[4] H04M *1/72*
U.S. Cl. 379—201 33 Claims

10. A telephone call screening apparatus for coupling to a plurality of telephone devices and to a telephone utility network, comprising:

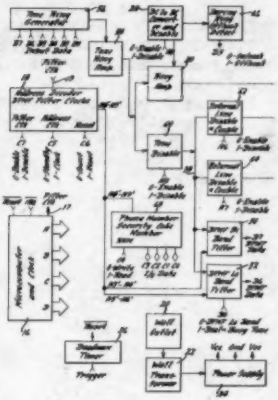
a means for storing a list comprising a plurality of access codes;

a trunk line port for coupling to said telephone utility network;

first and second telephone device ports for coupling to said plurality of telephone devices;

means for receiving an access code through said trunk line port and for comparing said received access code with said list; and

switching means responsive to said access code receiving and comparing means for establishing signal communication between said trunk line port and a selected ones of

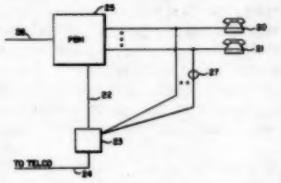


said device ports in accordance with the results of said comparison.

4,674,116
TELEPHONE LINE CONCENTRATOR WITHOUT SWITCHING MATRIX

William J. Curtin, Madison, Wis.; Cedric Adams, Glenview, Ill., and Stephen H. Soto, Madison, Wis., assignors to Amtelco, Madison, Wis.

Filed Jul. 3, 1985, Ser. No. 751,535
Int. Cl.[4] H04M *3/54*
U.S. Cl. 379—211 25 Claims



1. Apparatus for use in conjunction with a PBX system and a telephone answering system, comprising:

line scanning means for monitoring incoming calls on the telephone lines within the PBX system, said line scanning means including a plurality of detecting means each connected in parallel across a respective one of said monitored telephone lines in the PBX system for detecting ring signals on said telephone lines;

computer means coupled to each of said plurality of detecting means for counting the number of detected ring signals on each monitored line and for determining if said number of ring signals exceeds a predetermined limit;

coupling means connected to both said PBX and telephone answering systems, said coupling means being controlled by said computer means to dial said PBX system and cause it to carry out a directed call pick-up of said incoming call on said monitored line when said number of ring signals exceeds said predetermined limit and to simultaneously dial said telephone answering system using a different telephone line; and

said computer means further controls said coupling means to cause it to connect said incoming call to said telephone

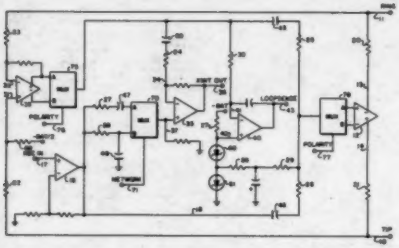
answering system without said incoming call having been answered.

4,674,117

SUBSCRIBER LINE CIRCUIT HAVING AN IMPROVED OFFHOOK SUPERVISION CIRCUIT

Robert V. Burns, Phoenix, Ariz., assignor to GTE Communication Systems Corporation, Phoenix, Ariz.

Filed Aug. 29, 1985, Ser. No. 770,465
Int. Cl.[4] H04M *3/22*
U.S. Cl. 379—377 **7 Claims**



1. In a subscriber line circuit having a tip conductor and a ring conductor connected to a subscriber loop circuit, an improved offhook supervision arrangement comprising:

amplifier means including a first input connected to said tip conductor and a second input connected to said ring conductor, said amplifier means arranged to develop and output a signal representative of the level of DC signals applied to said tip and ring conductors from said subscriber loop circuit over a first and a second output;

selection means including a first and a second input connected to said amplifier means first and second outputs respectively, said selection means including an output and an enabling lead, said selection means arranged to connect said amplifier means first output or alternatively said second output to said selection means output responsive to signals sent to said enabling lead;

comparator means having first and second inputs, said first input connected to said selection means output and arranged to receive said first amplifier means output signal; and,

reference means connected to said comparator means second input supplying said comparator means a reference signal having a predetermined level whereby, said comparator means outputs a signal responsive to the level of DC signals applied to said subscriber loop falling below the level of said reference means signal.

4,674,118

TELEPHONE LINE HOLD AND HOLD RELEASE APPARATUS

Roger J. Tosto, Yorktown Heights, N.Y., assignor to Tie/Communications, Inc., Shelton, Conn.

Filed Mar. 25, 1985, Ser. No. 715,725
Int. Cl.[4] H04M *1/72*
U.S. Cl. 379—393 **16 Claims**

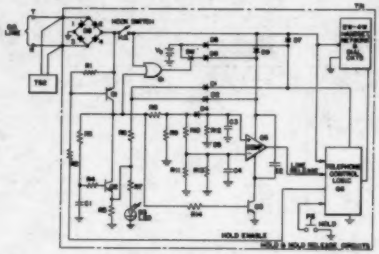
1. A telephone system comprising at least first and second telephone sets, each being connected to at least one common central office line, at least one of said telephone sets including a line hold and hold release means operative to cause release of said common central office line from the hold condition in response to either reclosing the hookswith of the telephone set on which a call is received, or closing the hookswitch of a telephone set on which the call is not received, or detecting a signal from the central office indicating that the caller has released the central office line, said line hold and hold release means comprising:

(a) hold control means;

(b) comparitor circuit means;

(c) control logic circuit means operative to receive a first input signal from said hold control means, a second input signal from said comparitor circuit means, and a third input signal from the hookswitch of the associated telephone set; and

(d) hold termination impedance circuit means including:



(i) a hold termination impedance; and

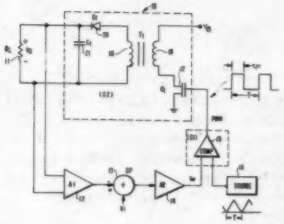
(ii) first and second transistor circuit means, said first transistor circuit means being operative in response to a signal generated by said control logic circuit means upon actuation of said hold control means to turn on said second transistor circuit means, thereby enabling the flow of loop current through said first and second transistor circuit means and said hold termination impedance.

4,674,119

WIDE-BAND HIGH VOLTAGE AMPLIFIER FOR TELEPHONE EXCHANGE SUBSCRIBER LINE INTERFACE UTILIZING LOW VOLTAGE CONTROL CIRCUITRY

Ramon C. W. Chea, Jr., Monroe, Conn., assignor to ITT Corporation, New York, N.Y.

Filed Apr. 10, 1984, Ser. No. 598,650
Int. Cl.[4] H04B *3/00*
U.S. Cl. 379—400 **16 Claims**



1. A wide-band, high voltage amplifier for use in a subscriber line circuit for supplying wide-band output signals to a two-wire line, said line characterized in exhibiting a determinable load impedance, comprising:

a flyback converter amplifier means including a storage capacitor coupled across said two-wire line, a transformer with primary and secondary windings, with said secondary winding coupled via a unidirectional conducting device to said storage capacitor, and switching means coupled in series with said primary winding;

means coupled across said capacitor to provide an output signal indicative of the signal across said capacitor;

summing means having one input responsive to said output signal indicative of said signal across said capacitor and another input responsive to wide-band input signals for application to said line, an output of said summing means providing an error signal indicative of the difference in said two signals applied to said inputs;

modulator means having one input responsive to said error signal and another input responsive to a repetitive reference signal to provide at an output a repetitive pulse signal having a pulse width indicative of the magnitude of said error signal, said repetitive reference signal being a triangular signal having a frequency rate of at least 512 KHz, said summing means further including amplifier means operative to provide a gain frequency characteristic to said error signal prior to applying same to said modulator means, said modulator also including a comparator having one input responsive to said error signal and another input responsive to said repetitive reference signal to provide a pulse width modulated signal; and

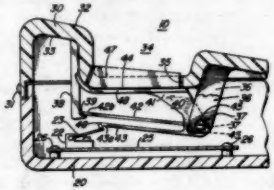
means for applying said repetitive pulse signal to said switching means to cause said flyback converter to transfer energy to said capacitor according to the magnitude of said error signal as manifested by the width of said pulse signal, whereby said wide-band, high voltage amplifier is responsive to input signals having a wide frequency range for providing wide-band output signals, for the line circuit, having a wide frequency range and a wide amplitude range.

4,674,120

HOOK SWITCH ACTUATOR ASSEMBLY

Stanley W. Heldenbrand, San Jose, Calif., assignor to Northern Telecom Limited, Montreal, Canada

Filed Nov. 12, 1985, Ser. No. 796,955
Int. Cl.[4] H04M *1/08*
U.S. Cl. 379—427 **5 Claims**



1. An actuator assembly for operating a hook switch in a telephone set, the telephone set having a base to which the hook switch is fixed, and a cover carried by the base, the cover having an outer surface, an inner surface, a cradle formation for receiving a handset against the outer surface, and an aperture in the cradle formation extending from the outer surface to the inner surface, the actuator assembly comprising:

pivot and stop formations depending from the inner surface of the cover; and

an actuating member pivotally mounted to the pivot formation and aligned with the aperture for actuating the hook switch, the actuating member including a cantilever spring means supported by the stop formation for urging the actuating member toward the inner surface of the cover to partially protrude through the aperture;

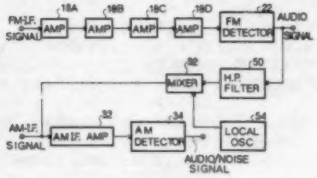
whereby placement of the handset in the cradle formation pivots the actuating member away from the inner surface of the cover and actuates the hook switch.

4,674,121

CIRCUIT FOR DETECTING THE LEVEL OF NOISE IN FM SIGNAL FOR USE IN AM/FM RECEIVER

Masami Miura, and Naotoshi Higashiyama, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Sep. 18, 1985, Ser. No. 777,163
Claims priority, application Japan, Sep. 18, 1984, 59-194971; Oct. 2, 1984, 59-206546
Int. Cl.[4] H04H *5/00*
U.S. Cl. 381—10 **51 Claims**



1. A circuit for detecting the level of noises in received FM signals, for use in an AM/FM receiver which includes at least an FM intermediate-frequency amplifier, an FM detector connected thereto, an AM intermediate-frequency amplifier and an AM detector connected thereto, comprising:

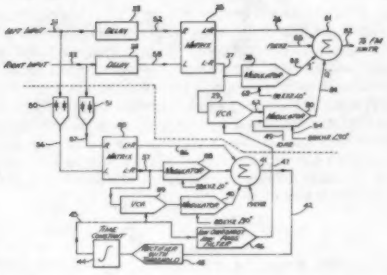
a frequency converting means receiving the output of the FM detector for converting noise components contained in the output of the FM detector into a noise signal of the AM intermediate-frequency and for outputting the converted noise signal to the AM intermediate-frequency amplifier, so that the converted noise signal is amplified by the AM intermediate-frequency amplifier and then detected by the AM detector thereby to provide a DC signal representative of the level of the noise contained in the received FM signal.

4,674,122

ENCODING FOR THE FMX COMPANDING SYSTEM

Robert A. Orban, Belmont, Calif., assignor to Orban Associates, Inc., San Francisco, Calif.

Filed Aug. 22, 1986, Ser. No. 899,148
Int. Cl.[4] H04H *5/00*
U.S. Cl. 381—13 **10 Claims**



1. An FM stereophonic broadcasting system comprising:

a first section for receiving L and R audio signals and for providing a first combined signal comprising L+R and a subcarrier modulated by L−R;

a Q section for providing a second combined signal comprising

said subcarrier shifted in phase and modulated by a compressed L−R signal, said compression being controlled by a first control signal;

pilot subsystem comprising a pilot first section substantially

similar to said first section coupled to receive said L and R audio signals and a pilot Q section substantially similar to said Q section for providing a third combined signal;

filtering means for filtering said third combined signal to provide said first control signal for said compression in said Q section; and,

delay means for delaying said L and R audio signals coupled to said first section such that said audio signals are first received by said pilot subsystem, said delay means being coupled to said first section;

whereby compression in said Q channel is achieved.

4,674,123

TEST BENCH FOR THE ADJUSTMENT OF ELECTRO-ACOUSTIC CHANNELS AND PARTICULARLY OF DEVICES FOR AUDITORY CORRECTION

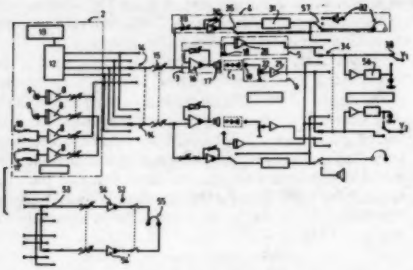
Frederic Michas, 86 Avenue Trespoey, 64000 Pau, France

Filed May 25, 1984, Ser. No. 614,827

Claims priority, application France, May 27, 1983, 83 09120

Int. Cl.[4] H04R *29/00*

U.S. Cl. 381—60 **18 Claims**



1. Test bench for the adjustment of an electro-acoustic auditory correction apparatus, said apparatus restoring with fidelity the tone and volume of sound with appropriate intensity as a function of the frequency of response of a hearing impaired person, said bench comprising: several sources (2) for the production of at least one first electric signal, at least one means (3) to transform said first electric signal into a first sonic signal, said first sonic singal being received by at least one means (5) to directly transform it into a second electric signal and said first sonic signal being received in said auditory correction apparatus (1), said auditory correction apparatus transforming said first sonic signal into a second sonic signal, at least one means (6) to transform said second sonic signal into a third electric signal, at least one assembly (4) to model said auditory correction apparatus in a manner suitable with respect to the response of a hearing impaired person, said assembly delivering a fourth electric signal in response to said first electric signal, means to display said second, third and fourth electric signals, and means to record said display.

4,674,124

MULTICHANNEL MASKING SOUND GENERATOR

Thomas R. Horrall, Harvard, Mass., and Richard A. Greiner, Madison, Wis., assignors to Bolt Beranek and Newman Inc., Cambridge, Mass.

Filed Jun. 6, 1985, Ser. No. 741,966

Int. Cl.[4] G01K *11/00*

U.S. Cl. 381—73.1 **3 Claims**

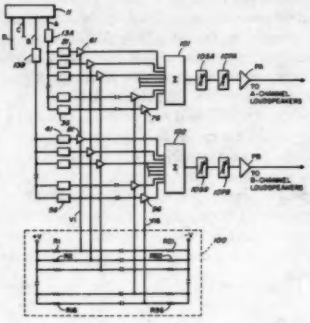
2. A multichannel masking sound source comprising:

a psuedo random noise generator providing a plurality of noise source signals which have the same spectral content but which are incoherently related within the desired noise masking spectrum;

connected to each source signal, a multiplicity of bandpass filters, each corresponding to a different frequency range within said spectrum, the filters connected to each source signal being matched in bandpass characteristics with those connected to the other source signal;

for each bandpass filter, a gain controlled amplifier for selectively adjusting the signal level obtained through the respective filter;

for each set of frequency matched bandpass filters, resistive divider means for applying a preselected control signal in common to the respective gain-controlled amplifiers, thereby to match the signal levels obtained through the respective filters;



a respective means for summing the signals obtaining through each multiplicity of bandpass filters, thereby to obtain a respective shaped spectrum signal;

linked gain control means for commonly adjusting the level of said shaped spectrum signals;

a plurality of loudspeakers for each noise source signal; and

respective power amplifier means suitable for energizing the respective plurality of loudspeakers from each of said level adjusted, shaped spectrum signals, whereby the frequency spectrum applied to all loudspeakers will be the same even though the signals applied to different speakers may be incoherently related within the spectrum.

4,674,125

REAL-TIME HIERARCHAL PYRAMID SIGNAL PROCESSING APPARATUS

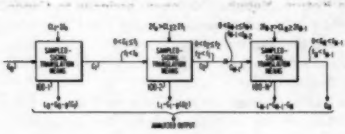
Curtis R. Carlson, Princeton Township, Mercer County; James H. Arbeiter, Hopewell Township, Mercer County, and Roger F. Bessler, West Windsor Township, Mercer County, all of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Apr. 4, 1984, Ser. No. 596,817

Claims priority, application United Kingdom, Jun. 27, 1983, 8317406; Jun. 27, 1983, 8317407

Int. Cl.[4] G06K *9/54*

U.S. Cl. 382—49 **39 Claims**



1. Signal processing apparatus responsive to a given temporal signal that defines an information component having a frequency spectrum, said apparatus employing pipe-line architecture for analyzing in delayed real time the frequency spectrum of said information component of said given temporal signal, wherein said component corresponds to information

having a given number of dimensions, and wherein said frequency spectrum includes a highest frequency of interest which is no greater than a frequency f_0; said apparatus comprising:

a set of N ordinally arranged sampled-signal translation means (where N is a plural integer), each one of said translation means including first and second input terminals and first and second output terminals; said first input terminal of each one of said second to said Nth translation means of said set being coupled to said first output terminal of its immediately preceding one of said translation means of said set for forwarding a signal from each one of said translation means to its immediately following one of said translation means of said set;

means for applying said given temporal signal to said first input terminal of the first translation means of said set; and

means for applying a separate sampling frequency clock to the second input terminal of each one of said translation means of said set to derive a sample rate for respective signals derived at said first and second output terminals of that translation means equal to the sampling frequency of the clock applied thereto; wherein:

each one of said translation means of said set exhibits for said information component a low-pass transfer function between its first input terminal and its first output terminal, said low-pass transfer function of each translation means of said set having a nominal cut-off frequency that is a direct function of the sampling frequency of the clock applied to the second input terminal of that one of said translation means of said set;

the clock applied to the second input terminal of said first translation means of said set has a sampling frequency that (1) is twice f_0, and (2) provides for said information component a nominal cut-off frequency for said low-pass transfer function of said first translation means of said set which is less than f_0;

the clock applied to the second input terminal of each one of said second to Nth translation means of said set has a sampling frequency that (a) is less than the clock frequency applied to the second input terminal of its immediately preceding one of the translation means of said set, (b) is at least equal to twice any frequency of the information component of the signal applied to its first input terminal, and (c) provides a nominal cut-off frequency for its low-pass transfer function which is less than that of its immediately preceding translation means of said set; and

the information component of said signal derived at said second output terminal of each one of said translation means of said set corresponds to a subtractive difference between the information component of the signal applied to said first input terminal thereof and a direct function of the information component of the signal derived at the first output terminal thereof.

4,674,126

IMAGE SIGNAL PROCESSING APPARATUS

Masahide Kotera, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 4, 1984, Ser. No. 647,157

Claims priority, application Japan, Sep. 12, 1983, 58-168548; Sep. 12, 1983, 58-168549; Sep. 12, 1983, 58-168550

Int. Cl.[4] H04N *1/40*

U.S. Cl. 382—53 **22 Claims**

1. An image signal processing apparatus comprising:

means for inputting an analog image signal;

means for detecting a peak of the slope of the input analog image signal;

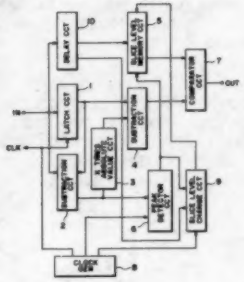
means for holding the input analog image signal corresponding to the detected peak of the slope of the input analog image signal; and

means for binary encoding the input analog image signal using as a threshold signal the analog image signal held by said holding means.

10. An image processing apparatus comprising:

means for inputting an analog image signal;

means for detecting a rate of change in the input analog image signal;



means for modifying the slope of the input analog image signal in accordance with the detected rate of change; and

means for binary encoding of the modified analog image signal.

4,674,127

LINER BAG FOR USE IN CONTAINERS

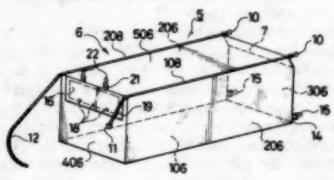
Hideo Yamada; Shigemi Ichiki; Hisamoto Naniwa; Susumu Uchida; Kenji Kadokura; Susumu Tsunoda, and Kunio Nakajima, all of Tokyo, Japan, assignors to Nippon Yusen Kaisha and Nihon Matai Co., Ltd., both of Tokyo, Japan

Filed Jun. 27, 1986, Ser. No. 879,431

Claims priority, application Japan, Jun. 29, 1985, 59-99274[U]

Int. Cl.[4] B65D *33/06*

U.S. Cl. 383—6 **4 Claims**



1. A liner bag for use in containers comprising :

a liner bag main body having a bottom face at least covering the container bottom wall, a pair of side faces covering both of the container side walls respectively, a front face covering the container front wall and an upper face covering the container upper wall, in which the joining edge between the upper face and at least one of the side faces is curved convexly toward the joining edge with the other of the side faces;

engaging members for detachably engaging the portions near the upper and lower four corners of the said main body on the front side respectively to the container;

a pair of engaging metal members attached respectively to the two upper corners of the container on the side of a door; and

a pair of side belts which are attached along the joining edges between said upper face and both of said side faces respectively, the ends of which are led out from the ends of the upper face on the side of said door and in which the

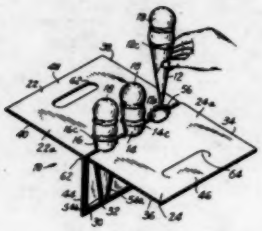
led out portions are clamped with each other after being engaged to the engaging metal members respectively.

4,674,128

CARRYING BAG FOR CONES WITH FROZEN COMESTIBLES

Stanley L. Ruff, Arbor Dr., New Rochelle, N.Y. 10804

Filed Oct. 29, 1984, Ser. No. 665,728
Int. Cl.[4] B65D 75/24
U.S. Cl. 383—10 9 Claims



1. A carrying bag for holding a plurality of edible cones on upper open end regions of which frozen comestibles are deposited, comprising:

(A) a pair of substantially planar, flexible, limp sheets of substantially the same size and shape, said sheets having lower portions in juxtaposed registration with each other, and upper portions movable relative to each other between a cone-filling position in which the upper portions are spaced apart from each other, and a cone-carrying position in which the upper portions are in juxtaposed registration with each other,

(i) said upper portions having smooth, slippery surfaces which face each other in the cone-carrying position, and opposite pairs of unjoined side edge regions,

(ii) said lower portions having a closed bottom edge region, and opposite pairs of joined side edge regions colinear with the unjoined side edge regions in the cone-carrying position;

(B) means for joining the lower portions to each other between the opposite pairs of joined side edge regions at a plurality of pairs of spaced zones, each pair of spaced zones converging toward each other in a direction generally downwardly toward the bottom edge region, and for forming generally conical pockets in which respective edible cones are supportably received in upright condition between the joined side edge regions with the respective frozen comestibles supported above the lower portions and between the smooth, slippery surfaces of the upper portions in the cone-carrying position; and

(C) handle means on the upper portions above the center of gravity of the bag when the pockets are filled with cones, for carrying the cones in a stable equilibrium, said handle means including a pair of handle portions on the upper portions and interconnected with each other in the cone-carrying position to join the upper portions to each other only at the interconnected handle portions and to position the smooth, slippery surfaces of the upper portions into conforming contact with the frozen comestibles therebetween and to prevent the frozen comestibles from escaping through the unjoined side edge regions during carrying.

4,674,129

PACKAGING BAG WITH SELECTIVELY SECURED REINFORCING LAYER

Veikko I. Janhonen, Langvik, 02420 Jorvas, Finland

Continuation of Ser. No. 609,985, May 14, 1984, abandoned.
This application Mar. 31, 1986, Ser. No. 846,277
Int. Cl.[4] B65D 33/02
U.S. Cl. 383—119 8 Claims

1. An envelope comprising inner and outer sheets of thin flexible material and an intermediate sheet of a reinforcing material having a resistance to bending greater than that of said inner and outer sheets, all of said sheets being elongated and having first and second portions on opposite sides of a laterally extending fold line substantially midway between the ends of said sheets; said first portion of each of said inner and outer sheets being wider than said first portion of said intermediate sheet to form sealing flaps, the ends of said inner and outer sheets of said first portion extending beyond said intermediate sheet to provide a double thickness closure flap; said inner and outer sheets being bonded to each other in the area of said sealing and closure flaps; the width of said second portion of all of said sheets being the same; said intermediate sheet being secured only to one of said inner and outer sheets and only to one of said first and second portions thereof; all of said sheets being folded about said fold line to provide a triple thickness bottom with said first and second portions extending generally parallel to each other as the back and front panels of the envelope, said sealing flaps being folded over against and bonded to said second portion of said outer sheet to provide double thickness side walls.

DESIGNS

JUNE 16, 1987

290,300
SWIMSUIT
Barbara B. Petruzzi, 11 Grove St., Bayville, N.Y. 11709
Filed Feb. 13, 1985, Ser. No. 572,587
Term of patent 14 years
U.S. Cl. D2—40

290,301
T-SHIRT
Marc H. Levy, 4 Pine Acre Ct., Deer Park, N.Y. 11729
Filed Feb. 13, 1984, Ser. No. 579,361
Term of patent 14 years
U.S. Cl. D2—215

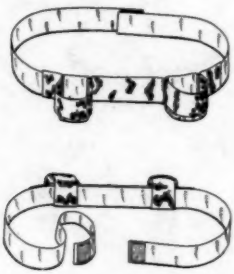
290,302
LEG WARMER
Walter A. Campbell, 744 NE. 113th St., Miami, Fla. 33161
Filed Mar. 25, 1985, Ser. No. 715,711
Term of patent 14 years
U.S. Cl. D2—267

290,303
DISPOSABLE SURGICAL BOOT
Charles E. Womack, 2122 Helton Dr., Florence, Ala. 35630
Filed Jun. 4, 1984, Ser. No. 617,119
Term of patent 14 years
U.S. Cl. D2—272

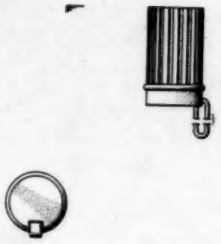
290,304
GLOVE
Jimmy Fink, 15 Bayard Rd., Scarsdale, N.Y. 10583
Filed Mar. 4, 1985, Ser. No. 707,915
Term of patent 14 years
U.S. Cl. D2—617

290,305
GLOVE OR SIMILAR ARTICLE
Rebecca W. Pranica, Appleton, Wis., assignor to Zwicker Knitting Mills, Appleton, Wis.
Filed Jul. 2, 1984, Ser. No. 627,272
Term of patent 14 years
U.S. Cl. D2—621

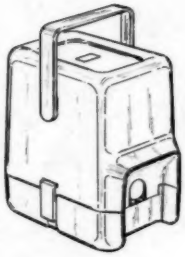
290,306
COMBINED BELT AND TENNIS BALL HOLDER
Bobby S. Pickens, 1403 Caldwell St., Greensboro, N.C. 27406
Filed Oct. 17, 1984, Ser. No. 661,791
Term of patent 14 years
U.S. Cl. D2—630



290,307
UMBRELLA HANDLE
Ann S. Cain, Cincinnati, Ohio, assignor to 'totes', incorporated, Loveland, Ohio
Filed Oct. 14, 1986, Ser. No. 918,870
Term of patent 14 years
U.S. Cl. D3—12



290,308
CARRIER FOR A WINE CASK BLADDER AND SPIGOT
Arthur R. Carlson, 401A Waverley Road, East Malvern, Victoria 3145, Australia
Filed May 21, 1984, Ser. No. 612,732
Claims priority, application Australia, Dec. 5, 1983, 5895/83
Term of patent 14 years
U.S. Cl. D3—30.1

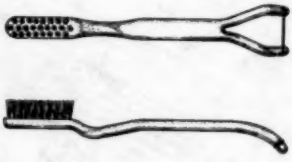


290,309
SADDLE BAG FOR AN UMBRELLA STROLLER
Marilyn L. Welch, 16506 E. Stanford Pl., Aurora, Colo. 80015
Filed Sep. 17, 1984, Ser. No. 651,107
Term of patent 14 years
U.S. Cl. D3—41

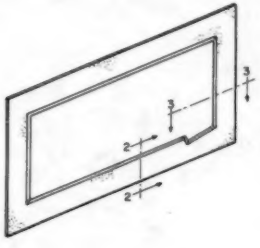
290,310
CLOSURE HANDLE FOR A DIVER'S BAG
Alan K. Uke, 1916 Crest Ave., Encinitas, Calif. 92024
Filed Sep. 20, 1984, Ser. No. 652,229
Term of patent 14 years
U.S. Cl. D3—54

290,311
STIFFENING TIP FOR A FASTENING STRAP FOR HOLSTERS
Donald B. Metzger, Fallbrook, Calif., assignor to Bianchi International, Inc., Temecula, Calif.
Filed Nov. 5, 1984, Ser. No. 667,958
Term of patent 14 years
U.S. Cl. D3—101

290,312
COMBINED TOOTHBRUSH AND DENTAL FLOSS HOLDER
Lih-Po Wang, P.O. Box 10780, Taipei, Taiwan
Filed Aug. 15, 1985, Ser. No. 766,332
Term of patent 14 years
U.S. Cl. D4—108

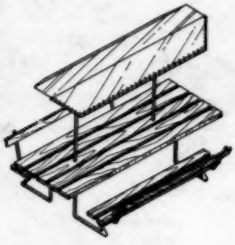


290,313
PICTURE MAT WITH NOTCH FOR ARTIST'S SIGNATURE
Richard Briggs, 6726 Winterset Garden Rd., Winter Haven, Fla. 33880
Filed Jun. 21, 1984, Ser. No. 622,955
Term of patent 14 years
U.S. Cl. D6—300

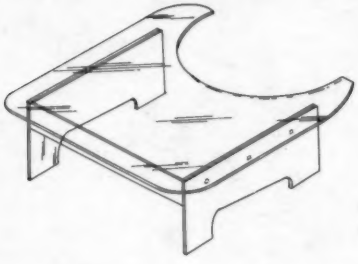


290,314
TIE RACK
Ruth M. Liebau, Rte. 1, P.O. Box 64-L, Oxford, Miss. 38655
Filed Oct. 12, 1984, Ser. No. 660,149
Term of patent 14 years
U.S. Cl. D6—320

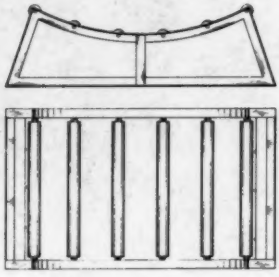
290,315
COMBINED PICNIC TABLE AND CANOPY THEREFOR
Neil C. Swenson, and Duain Swenson, both of 107 Regency Rd., Le Sueur, Minn. 56058
Filed Aug. 16, 1984, Ser. No. 641,301
Term of patent 14 years
U.S. Cl. D6—337



290,316
PORTABLE SUPPORT STAND FOR A TYPEWRITER
Gail L. Chiasson, 120 Huntington, Lafayette, La. 70508
Filed Jun. 18, 1984, Ser. No. 621,476
Term of patent 14 years
U.S. Cl. D6—406

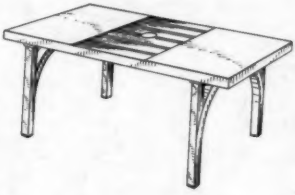


290,317
SUPPORT FOR DISPLAYING AND DISPENSING ROLL CARPETING
George Tristan, 7600 Callaghan Rd., Apt. 315, San Antonio, Tex. 78229
Filed Nov. 26, 1984, Ser. No. 675,022
Term of patent 14 years
U.S. Cl. D6—409

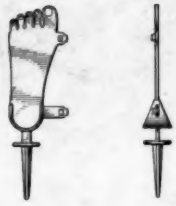


290,318
TABLE
Richard D. Berry, Jr., Hickory, N.C., assignor to Design Institute America, Inc., Montpelier, Ohio
Filed Dec. 28, 1984, Ser. No. 687,448
Term of patent 14 years
U.S. Cl. D6—486

290,319
TABLE
Didier Deconinck, Seyssins, France, assignor to Allibert SA, Grenoble, France
Division of Ser. No. 579,077, Feb. 10, 1984. This application Mar. 5, 1986, Ser. No. 836,441
Claims priority, application Hague, Aug. 12, 1983, DM/00 2788
Term of patent 14 years
U.S. Cl. D6—488

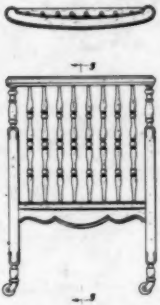


290,320
LEG ELEVATING SUPPORT FOR A SUNBATHER
Clint G. Cornette, #312, 34th Ave. Cherry Grove, North Myrtle Beach, S.C. 29576
Filed Dec. 17, 1984, Ser. No. 682,706
Term of patent 14 years
U.S. Cl. D6—491

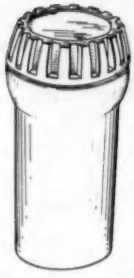


290,321
ARMREST FOR A CHAIR
Burkhard Vogtherr, Kandern-Holzen, Fed. Rep. of Germany, assignor to Klöber GmbH & Co., Fed. Rep. of Germany
Filed Jun. 18, 1984, Ser. No. 621,612
Term of patent 14 years
U.S. Cl. D6—500

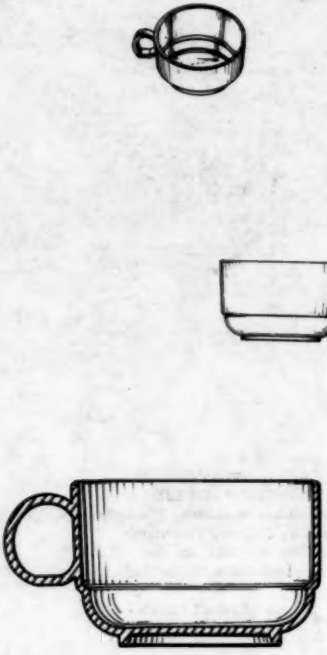
290,322
CRIB END
William S. Suvak, Salem, Ind., and Lloyd I. Snyder, Chatham, N.J., assignors to Smith Cabinet Manufacturing Company, Inc., Salem, Ind.
Filed Dec. 19, 1984, Ser. No. 683,586
Term of patent 14 years
U.S. Cl. D6—508



290,323
CUP WITH LID
Johannes H. Weernink, Ambt-Delden, Netherlands, assignor to Mepal Service B.V., Lochem, Netherlands
Filed Dec. 15, 1983, Ser. No. 562,291
Claims priority, application Netherlands, Jun. 15, 1983, 57962-00
Term of patent 14 years
U.S. Cl. D7—6



290,324
CUP
Joost R. Ritman, Bloemgracht 15-19, 1016 KB Amsterdam, Netherlands
Filed Jun. 4, 1984, Ser. No. 616,585
Term of patent 14 years
U.S. Cl. D7—9



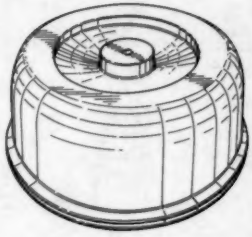
290,325
CUP
Joost R. Ritman, Bloemgracht 15-19, 1016 KB Amsterdam, Netherlands
Filed Jul. 18, 1984, Ser. No. 632,447
Term of patent 14 years
U.S. Cl. D7—9

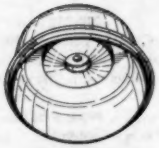
290,326

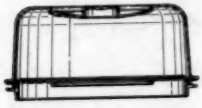
COVERED SERVING TRAY OR THE LIKE

Robert H. C. M. Duenen, Hekelgem, and Victor J. J. Cautereels, Borsbeek, both of Belgium, assignors to Dart Industries Inc., Northbrook, Ill.

Filed Aug. 30, 1984, Ser. No. 646,276
Term of patent 14 years
U.S. Cl. D7—17





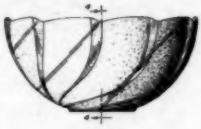


290,327

SALAD BOWL OR SIMILAR ARTICLE

Jean-Jacques Durand, LaBute, 62510 Arques, France

Filed Feb. 13, 1985, Ser. No. 701,157
Term of patent 14 years
U.S. Cl. D7—28



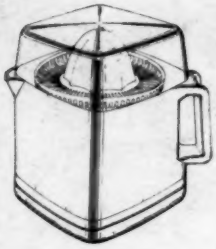
290,328

STRAW WITH A BOWL-LIKE HEAD

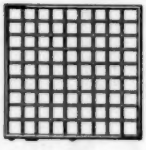
Mitsuru Imotani, 8-23, Nishi-Yamamoto-cho 1-chome, Yao-shi, Osaka, Japan

Filed Oct. 26, 1984, Ser. No. 665,376
Term of patent 14 years
U.S. Cl. D7—42

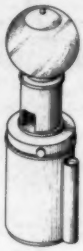
290,329
JUICE EXTRACTOR
Salvador B. Bulto, Barcelona, Spain, assignor to Moulinex, Societe Anonyme, Bagnolet, France
Filed Sep. 28, 1984, Ser. No. 655,914
Claims priority, application France, Apr. 9, 1984, 841630; Sep. 6, 1984, 843906
Term of patent 14 years
U.S. Cl. D7—49



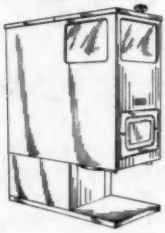
290,330
DISTILLED WATER DISPENSER
Gaetan Lagace, Melbourne, Canada, assignor to Ideal Aqua Miracle Inc., Weedon, Canada
Filed Nov. 16, 1984, Ser. No. 672,415
Term of patent 14 years
U.S. Cl. D7—306



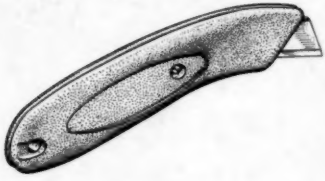
290,331
PEANUT BUTTER MACHINE
Victor V. Tabah, 431 Burnside Ave., Apt. 11-J, Los Angeles, Calif. 90036
Filed Jun. 15, 1984, Ser. No. 621,198
Term of patent 14 years
U.S. Cl. D7—372



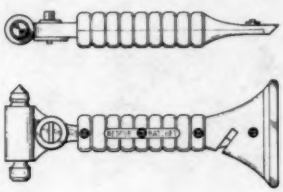
290,332
COFFEE GRINDER
Henry L. Foley, Chatam, and Raymond E. Van Camp, Rochester, both of Ill., assignors to Bunn-O-Matic Corporation, Springfield, Ill.
Filed Nov. 19, 1984, Ser. No. 672,916
Term of patent 14 years
U.S. Cl. D7—373



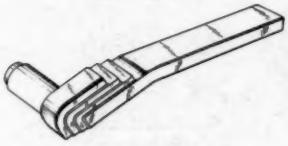
290,333
UTILITY KNIFE
Robert Pashley, Lake Geneva, Wis., assignor to Chicago Cutlery Consumer Products, Inc., Minneapolis, Minn.
Filed Jun. 27, 1984, Ser. No. 625,306
Term of patent 14 years
U.S. Cl. D8—99



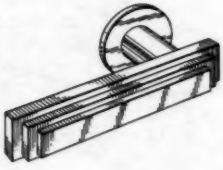
290,334
RESCUE TOOL
James E. Reynolds, Jr., Dallas, Tex., assignor to JRJ Industries, Dallas, Tex.
Filed Oct. 1, 1984, Ser. No. 655,839
Term of patent 14 years
U.S. Cl. D8—105



290,335
DOOR HANDLE
Aldo Cibic, Via Legnano 28, 20121 Milan, Italy
Filed Feb. 15, 1985, Ser. No. 701,983
Claims priority, application Italy, Aug. 29, 1984, 22944/84[U]
Term of patent 14 years
U.S. Cl. D8—308

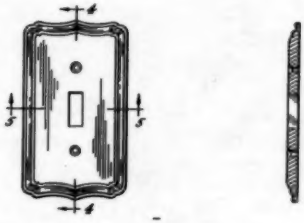


290,336
DOOR HANDLE
Stanley M. Paul, Rye, N.Y., assignor to Paul Associates, Long Island City, N.Y.
Filed Oct. 15, 1985, Ser. No. 787,244
Term of patent 14 years
U.S. Cl. D8—308



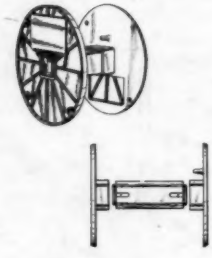
290,337
SUITCASE HANDLE
Gary Savage, Boucherville, Canada, assignor to Dionite Inc., Levis, Canada
Filed Sep. 12, 1985, Ser. No. 775,230
Term of patent 14 years
U.S. Cl. D8—316

290,338
ESCUTCHEON PLATE
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Oct. 28, 1985, Ser. No. 791,988
Term of patent 14 years
U.S. Cl. D8—350

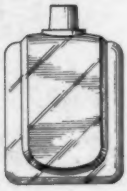


290,339
WIRE ROPE SOCKET
Archie J. Lowery, P.O. Box 650, Marrero, La. 70072
Filed Mar. 8, 1985, Ser. No. 709,685
Term of patent 14 years
U.S. Cl. D8—354

290,340
SPOOL ASSEMBLY
James A. McCaffrey, Norcross, Ga., assignor to Advanced Products Incorporated, Pittsburgh, Pa.
Filed Mar. 18, 1985, Ser. No. 713,413
Term of patent 14 years
U.S. Cl. D8—358

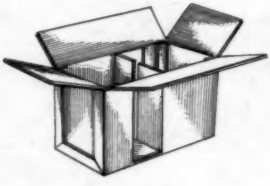


290,341
PERFUME BOTTLE OR SIMILAR ARTICLE
Jean-Jacques Durand, LaBute, 62510, Arques, France
Filed Feb. 28, 1985, Ser. No. 706,773
Term of patent 14 years
U.S. Cl. D9—384

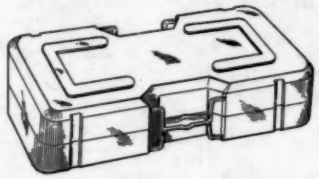


290,342
BOTTLE OR SIMILAR ARTICLE
Gerard E. Lyons, Burlington, Canada, assignor to Polybottle, Weston, Canada
Filed Feb. 1, 1985, Ser. No. 697,107
Claims priority, application Canada, Aug. 15, 1984, 15-08-84-1
Term of patent 14 years
U.S. Cl. D9—405

290,343
PACKAGING CONTAINER
Edward L. Osborne, Kansas City, Kans., assignor to Westvaco Corporation, New York, N.Y.
Filed Nov. 1, 1984, Ser. No. 667,422
Term of patent 14 years
U.S. Cl. D9—418



290,344
PACKAGING CONTAINER
Maxwell H. Toms, Maribyrnong, Australia, assignor to The Commonwealth of Australia, Canberra, Australia
Filed Jul. 17, 1984, Ser. No. 631,799
Claims priority, application Australia, Jan. 20, 1984, 6313/84
Term of patent 14 years
U.S. Cl. D9—424

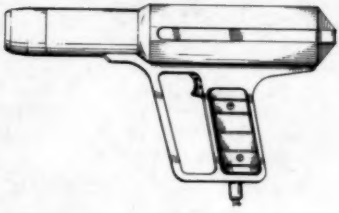


290,345
CARTON
Takehiko Abe, Tokyo, Japan, assignor to Hinoki Shinyaku Co., Ltd., Tokyo, Japan
Filed Oct. 10, 1984, Ser. No. 659,335
Claims priority, application Japan, Apr. 11, 1984, 59-14428
Term of patent 14 years
U.S. Cl. D9—431

290,346
COVER FOR A CONTAINER
Howard P. Siegel, Yonkers, N.Y., assignor to American Home Products Corporation, New York, N.Y.
Filed May 10, 1984, Ser. No. 608,691
Term of patent 14 years
U.S. Cl. D9—438

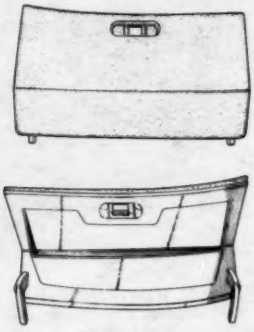
290,347
WATCH CASE
Jun Komatsu, Kanagawa, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan
Filed Jan. 18, 1985, Ser. No. 692,835
Claims priority, application Japan, Oct. 12, 1984, 59-42242
Term of patent 14 years
U.S. Cl. D10—38

290,348
TIMING LIGHT
David Frees, 5407 Amestoy Ave., Encino, Calif. 91316, and Edwin L. Schwartz, 16604 Park La. Pl., Los Angeles, Calif. 90049
Filed Nov. 13, 1984, Ser. No. 670,311
Term of patent 14 years
U.S. Cl. D10—112

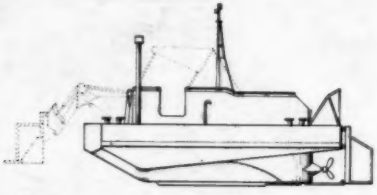


290,349
BELT ADJUSTER
Kazumi Kasai, Namerikawa, Japan, assignor to Nippon Notion Kogyo Co., Ltd., Tokyo, Japan
Filed Apr. 6, 1984, Ser. No. 597,277
Claims priority, application Japan, Oct. 7, 1983, 58-43574
Term of patent 14 years
U.S. Cl. D11—218

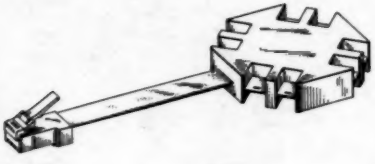
290,350
SWING DOOR FOR A GLOVE COMPARTMENT OF AN AUTOMOBILE
Carl-Olof B. Berglöf, Trollhättan, and Erik Sörum, Kungälv, both of Sweden, assignors to Saab-Scania Aktiebolag, Trollhättan, Sweden
Filed Sep. 11, 1984, Ser. No. 649,416
Claims priority, application Sweden, Apr. 18, 1984, 84-1282
Term of patent 14 years
U.S. Cl. D12—155



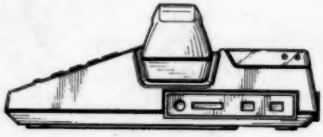
290,351
POLLUTION CONTROL VESSEL
Mary J. Caddick, 74 Winifred Lane, Aughton, Ormskirk, Lancashire L39 5DL, England
Filed Jan. 28, 1985, Ser. No. 695,468
Term of patent 14 years
U.S. Cl. D12—300



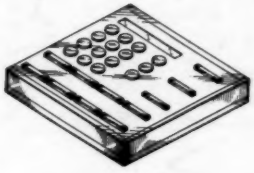
290,352
COMBINED EIGHT CONDUCTOR MODULAR PLUG AND TEST ADAPTER
Robert H. Knickerbocker, Cheshire, Conn., assignor to The Siemon Company, Watertown, Conn.
Filed Jul. 26, 1984, Ser. No. 634,748
Term of patent 14 years
U.S. Cl. D13—28



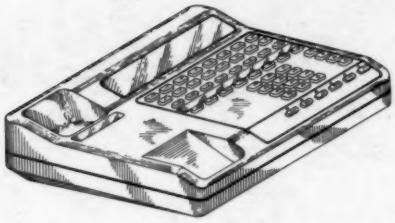
290,353
COMBINED TELEPHONE, AUTOMATIC ANSWERING AND RECORDING MACHINE
Kazuhiko Kawano, and Toru Tsunetsugu, both of Tokyo, Japan, assignors to Pioneer Ansafone Manufacturing Corporation, Saitama, Japan
Filed Aug. 23, 1985, Ser. No. 768,766
Claims priority, application Japan, Mar. 15, 1985, 60-10263
Term of patent 14 years
U.S. Cl. D14—52

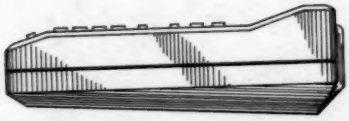


290,354
TELEPHONE SET ADD-ON ACCESSORY MODULE
Desmond J. Ryan, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada
Filed Jun. 11, 1984, Ser. No. 619,712
Term of patent 14 years
U.S. Cl. D14—60



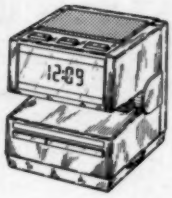
290,355
KEYBOARD STAND FOR A TELEPHONE HANDSET TRANSCEIVER
Albert L. Nagele, Wilmette, Ill., assignor to Motorola, Inc., Schaumburg, Ill.
Filed May 14, 1985, Ser. No. 734,361
Term of patent 14 years
U.S. Cl. D14—62



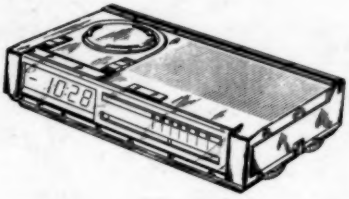


290,356
DIGITAL PAGER
Kim J. Fisher, St. Ives, United Kingdom, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Nov. 7, 1984, Ser. No. 669,124
Term of patent 14 years
U.S. Cl. D14—68

290,357
CLOCK RADIO RECEIVER
Henderikus P. Schouten, Valkenswaard, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Nov. 14, 1984, Ser. No. 671,259
Claims priority, application United Kingdom, May 31, 1984, 1020007
Term of patent 14 years
U.S. Cl. D14—73



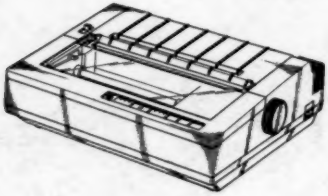
290,358
CLOCK RADIO RECEIVER
Sies K. Brandsma, Eersel, and Henderikus P. Schouten, Valkenswaard, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.
Filed Nov. 14, 1984, Ser. No. 671,258
Claims priority, application United Kingdom, May 31, 1984, 1020008
Term of patent 14 years
U.S. Cl. D14—73



290,359
TELEVISION RECEIVER
Chuichi Inoue; Hiroyuki Tsubaki, both of Osaka; Yoshiaki Kawata, Hyogo, and Toyoyuki Uematsu, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Oct. 3, 1984, Ser. No. 657,330
Claims priority, application Japan, Apr. 17, 1984, 59-15365
Term of patent 14 years
U.S. Cl. D14—80

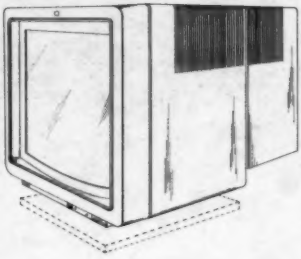
290,360
KEYBOARD FOR A PERSONAL COMPUTER
Thomas A. Anzelone, Ft. Lauderdale; Raymond F. Cotton, Boca Raton; Myron F. Davis, Boca Raton; Pedro D. del Sol, Boca Raton; Robert M. Ewart, Jr., Boca Raton; Fred E. Goetz, Boca Raton, and Paul B. Lewis, Boca Raton, all of Fla., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Jun. 20, 1984, Ser. No. 620,779
Term of patent 14 years
U.S. Cl. D14—100

290,361
PRINTER
Yasuo Nagamatsu; Masaharu Sakamoto; Toshiya Moriyama, and Isshin Miyamoto, all of Fukuoka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Jul. 3, 1984, Ser. No. 627,692
Term of patent 14 years
U.S. Cl. D14—111

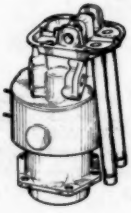


290,362
COMPUTER DISPLAY MONITOR
Tomoyuki Takahashi, Kanagawa, Japan, assignor to International Business Machines Corp., Armonk, N.Y.
Filed Oct. 9, 1984, Ser. No. 658,923
Term of patent 14 years
U.S. Cl. D14—113

290,363
COMPUTER DISPLAY OR THE LIKE
Ronald I. Conway, Port Ewen, and Samuel A. Lucente, Glenford, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Apr. 26, 1984, Ser. No. 604,263
Term of patent 14 years
U.S. Cl. D14—113



290,364
WATER-COOLED ENGINE CYLINDER
Ronald E. Wilkinson, Mobile, Ala., assignor to Teledyne Industries, Inc., Los Angeles, Calif.
Filed Dec. 31, 1984, Ser. No. 687,735
Term of patent 14 years
U.S. Cl. D15—5

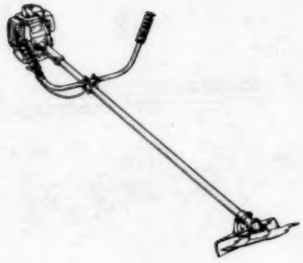


290,365

BUSH CUTTER

Hiroaki Hatano, and Takeshi Mochizuki, both of Numazu, Japan, assignors to Fuji Robin Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 4, 1985, Ser. No. 803,761
Claims priority, application Japan, May 31, 1985, 60-023231
Term of patent 14 years
U.S. Cl. D15—10

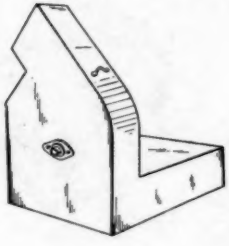


290,366

COMBINED GRASS COLLECTOR AND BLOWER

Thomas L. Hoepfner, 98 Prairiewood Dr., and Keith A. Leistikow, 88 Prairiewood Dr., both of Fargo, N. Dak. 58103

Division of Ser. No. 681,835, Dec. 14, 1984, Pat. No. Des. 285,690. This application Mar. 31, 1986, Ser. No. 847,579
Term of patent 14 years
U.S. Cl. D15—17

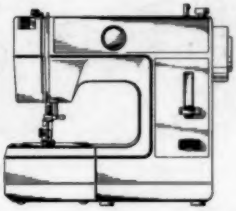


290,367

SEWING MACHINE

Tetsuya Aono, Osaka, Japan, assignor to Maruzen Sewing Machine Co., Ltd., Osaka, Japan

Filed Dec. 26, 1984, Ser. No. 686,584
Claims priority, application Japan, Jul. 3, 1984, 59-027602; Jul. 3, 1984, 59-027603
Term of patent 14 years
U.S. Cl. D15—69

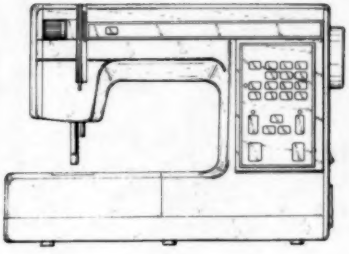


290,368

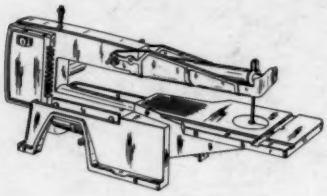
SEWING MACHINE

Yoshiaki Eguchi, Kodaira, Japan, assignor to Janome Sewing Machine Co., Ltd., Tokyo, Japan

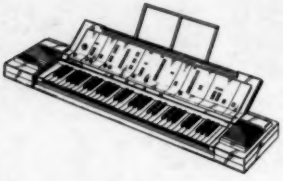
Filed Feb. 28, 1984, Ser. No. 584,533
Claims priority, application Japan, Jan. 20, 1984, 59-1287
The portion of the term of this patent subsequent to Sep. 9, 2000, has been disclaimed.
Term of patent 14 years
U.S. Cl. D15—69



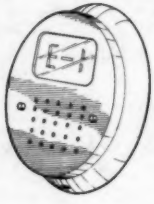
290,369
SCROLL SAW
Curtis J. Eccardt, County of St. Charles, and Richard B. Brundage, St. Louis, both of Mo., assignors to Emerson Electric Co., St. Louis, Mo.
Filed Aug. 13, 1984, Ser. No. 640,398
Term of patent 14 years
U.S. Cl. D15—133



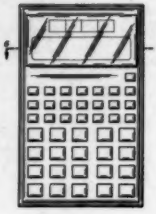
290,370
ELECTRONIC KEYBOARD MUSICAL INSTRUMENT
Mario Bellini, Milan, Italy, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Shizuoka, Japan
Filed Jun. 11, 1984, Ser. No. 619,020
Claims priority, application Japan, Dec. 17, 1983, 58-54.414
Term of patent 14 years
U.S. Cl. D17—1



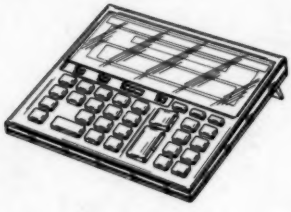
290,371
MUSICAL TUNING DEVICE
Peter D. Slayer, 358 W. Water St., Harrisonburg, Va. 22301, and Harrison F. S. Vining, 157 W. Grattan St., Harrisonburg, Va. 22801
Filed Dec. 3, 1984, Ser. No. 677,250
Term of patent 14 years
U.S. Cl. D17—99



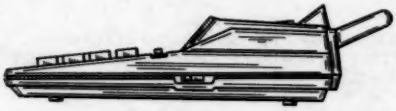
290,372
ELECTRONIC CALCULATOR
Takahisa Yubisui; Hiroshi Sakaguchi, and Katsuhiro Iida, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Apr. 22, 1985, Ser. No. 725,576
Claims priority, application Japan, Oct. 22, 1984, 59-43907
Term of patent 14 years
U.S. Cl. D18—7



290,373
ELECTRONIC CALCULATOR
Takahisa Yubisui, and Hiroshi Sakaguchi, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Jan. 18, 1985, Ser. No. 692,905
Claims priority, application Japan, Jul. 18, 1984, 59-30286
Term of patent 14 years
U.S. Cl. D18—7

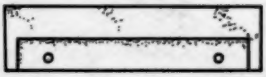


290,374
ELECTRONIC PRINTING CALCULATOR
Takahisa Yubisui, and Noriko Satake, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed May 3, 1985, Ser. No. 730,355
Claims priority, application Japan, Nov. 5, 1984, 59-45908
Term of patent 14 years
U.S. Cl. D18—7



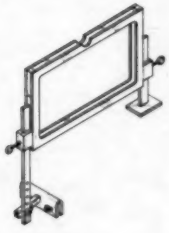
290,375
COMBINED NOTEBOOK, CALCULATOR AND CASING THEREFOR
Rinaldo Nava, Milan, Italy, assignor to Nava Milano S.p.A., Milan, Italy
Filed Jul. 10, 1984, Ser. No. 629,528
Claims priority, application Italy, Jan. 20, 1984, 20601B/84[U]
Term of patent 14 years
U.S. Cl. D19—26

290,376
IDENTIFYING TAB FOR BOOK SPINE
Michael E. Maune, St. Louis County, Mo., assignor to Enduro Binders, Inc., Syracuse, N.Y.
Division of Ser. No. 483,643, Apr. 11, 1983. This application Feb. 28, 1986, Ser. No. 838,026
Term of patent 14 years
U.S. Cl. D19—32

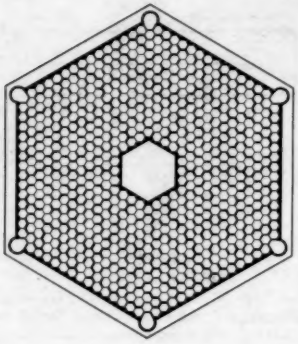


290,377
PORTABLE SIGN
John M. Wood, 1501 N. 9th #24; Gary D. McGuire, 1416 N. 9th, both of Sapulpa, Creek County, Okla. 74066, and Doyle E. Wright, 1219 E. 8th, Sand Springs, Tulsa County, Okla. 74063
Filed Mar. 2, 1984, Ser. No. 585,392
Term of patent 14 years
U.S. Cl. D20—10

290,378
VEHICLE TOP SIGN CARRIER
Rickie W. Anderson, 2453 Garapan, Houston, Tex. 77091
Filed Aug. 19, 1985, Ser. No. 766,577
Term of patent 14 years
U.S. Cl. D20—10



290,379
GAME BOARD
Trach Bergh, R.R. 1 Box 47, Hallock, Minn. 56728, and Joseph J. Cooney, 1336 Summerland Ave., San Pedro, Calif. 90732
Filed Oct. 4, 1984, Ser. No. 657,616
Term of patent 14 years
U.S. Cl. D21—33

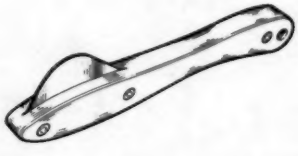


290,380
STILT
E. Christine Rau, 2515 Struthmore Dr., Lima, Ohio 45806
Filed Apr. 6, 1984, Ser. No. 597,715
Term of patent 14 years
U.S. Cl. D21—72

290,381
DOLL BODY
Barbara K. Wisber, Perkasie, Pa., assignor to Ladie and Friends, Inc., Dublin, Pa.
Filed Dec. 19, 1985, Ser. No. 810,744
Term of patent 14 years
U.S. Cl. D21—154

290,382
HOUSING FOR CONTAINING ELECTRONIC CIRCUITRY FOR ISOTONIC EXERCISE DEVICE
Sanchez C. Sawit, 194 Wembley, Daly City, Calif. 94015
Filed Oct. 22, 1984, Ser. No. 663,741
Term of patent 14 years
U.S. Cl. D21—191

290,383
HUNTING KNIFE
Carl-Gustav Sjöqvist, Klostergatan 10, S-552 56 Jönköping, Sweden
Filed Oct. 11, 1984, Ser. No. 659,636
Claims priority, application Sweden, Apr. 16, 1984, 84-1267
Term of patent 14 years
U.S. Cl. D22—118

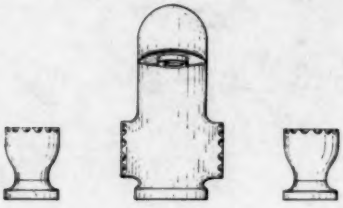


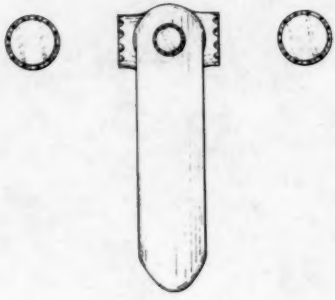
290,384
HANDLE FOR A SPIN CASTING FISHING ROD
Ronald A. McNeil, P.O. Box 1127, Havana, Fla. 32333
Filed Jun. 13, 1984, Ser. No. 620,022
Term of patent 14 years
U.S. Cl. D22—142

290,385
HANDLE FOR A BAIT CASTING FISHING ROD
Ronald A. McNeil, P.O. Box 1127, Havana, Fla. 32333
Filed Jun. 13, 1984, Ser. No. 620,393
Term of patent 14 years
U.S. Cl. D22—142

290,386
WATER PURIFIER OR SIMILAR ARTICLE
James M. Padilla, Covina Heights, Calif., assignor to Cuno Incorporated, Meriden, Conn.
Filed Jul. 19, 1984, Ser. No. 632,566
Term of patent 14 years
U.S. Cl. D23—3

290,387
BATHROOM FAUCET SET
Gerhard E. Joerger, Hans-Thoma-Strasse 89-99, 6800 Mannheim 25, Fed. Rep. of Germany
Filed Aug. 12, 1985, Ser. No. 764,901
Claims priority, application Fed. Rep. of Germany, Mar. 8, 1985, MRV/1297; Mar. 15, 1985, MRV/1298
Term of patent 14 years
U.S. Cl. D23—25

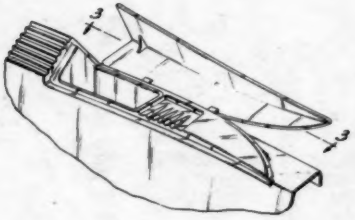




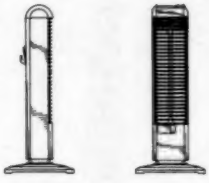
290,388
SHOWER HANDLE SET
Holly K. Yost, Studio City, Calif., assignor to Price Pfister, Inc., Pacoima, Calif.
Continuation-in-part of Ser. No. 587,620, Mar., 1984, Pat. No. Des. 285,106. This application Jul. 2, 1984, Ser. No. 627,152
Term of patent 14 years
U.S. Cl. D23—29

290,389
FAUCET HANDLE
Hsi Chia Ko, No. 69, Lane 22, Chang Ting Road, Lu Kang Jenn, Changhua Hsien, Taiwan
Filed Aug. 12, 1985, Ser. No. 764,586
Term of patent 14 years
U.S. Cl. D23—29

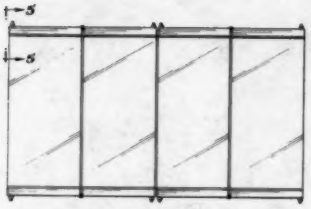
290,390
SET OF WELLS FOR BATHTUBS
Harvey E. Diamond, 12953 Woodbridge St., Studio City, Calif. 91604
Filed Aug. 16, 1984, Ser. No. 641,315
Term of patent 14 years
U.S. Cl. D23—69



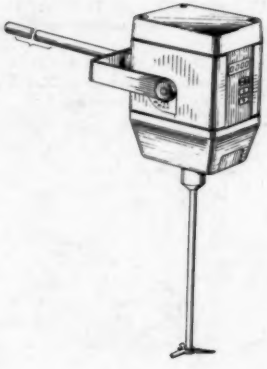
290,391
ELECTRIC RADIANT HEATER
Kazuharu Nakamura, Aichi, Japan, assignor to Toyotomi Kogyo Co., Ltd., Aichi, Japan
Filed Dec. 17, 1985, Ser. No. 809,952
Claims priority, application Japan, Jun. 18, 1985, 60-25738
Term of patent 14 years
U.S. Cl. D23—123



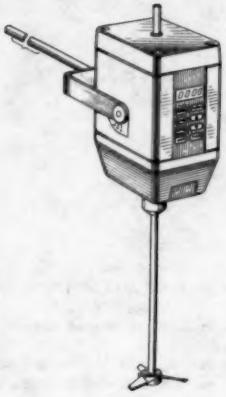
290,392
GLASS FIREPLACE DOOR
Joseph D. Coscione, Ontario; John T. French, Fountain Valley, and Willard P. Harris, Trabuco Canyon, all of Calif., assignors to Fireplace Manufacturers, Inc., Santa Ana, Calif.
Filed Mar. 14, 1985, Ser. No. 711,623
Term of patent 14 years
U.S. Cl. D23—138.3



290,393
LAB MIXER
Philip H. Stevens, and Charles F. T. Merritt, both of Skaneateles, N.Y., assignors to General Signal Corporation, Stamford, Conn.
Filed Oct. 12, 1984, Ser. No. 660,611
Term of patent 14 years
U.S. Cl. D24—8



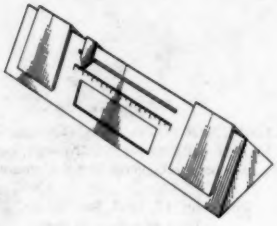
290,394
LAB MIXER WITH ADJUSTABLE SHAFT
Philip H. Stevens, and Charles F. T. Merritt, both of Skaneateles, N.Y., assignors to General Signal Corporation, Stamford, Conn.
Filed Oct. 12, 1984, Ser. No. 660,610
Term of patent 14 years
U.S. Cl. D24—8



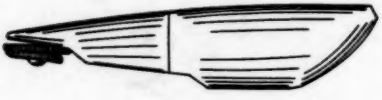
290,395
LAB MIXER WITH ADJUSTABLE SHAFT
Philip H. Stevens, and Charles F. T. Merritt, both of Skaneateles, N.Y., assignors to General Signal Corporation, Stamford, Conn.
Filed Oct. 12, 1984, Ser. No. 660,210
Term of patent 14 years
U.S. Cl. D24—8

290,396
DEFIBRILLATOR PADDLE
Paul W. Jones, Issaquah, and Casey M. Bardue, Seattle, both of Wash., assignors to Physio-Control Corporation, Redmond, Wash.
Filed Jan. 8, 1985, Ser. No. 689,744
Term of patent 14 years
U.S. Cl. D24—17

290,397
SLIDING SCALE DEVICE FOR MEDICAL DIAGNOSTIC PURPOSES
Peter Starkey, Luton, England, assignor to Alternate Resources Limited, England
Filed Nov. 15, 1984, Ser. No. 671,982
Claims priority, application United Kingdom, May 21, 1984, 1,019,787
Term of patent 14 years
U.S. Cl. D24—17

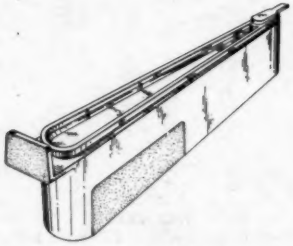


290,398
DEPILATOR
Yair Daar, Moshav Galia, and Shimon Yahav, 61 Remez Street, Rehovot, both of Israel
Filed Mar. 2, 1984, Ser. No. 585,486
Claims priority, application Israel, Sep. 15, 1983, 9622; Sep. 15, 1983, 9623; Feb. 17, 1984, 9798
Term of patent 14 years
U.S. Cl. D24—26

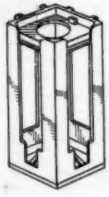


290,399
COMBINED DRIVER AND EXTRACTOR FOR INTRAMEDULLARY PINS OR THE LIKE
David G. Kitchens, Warsaw, Ind., assignor to Zimmer, Inc., Warsaw, Ind.
Filed Mar. 4, 1985, Ser. No. 708,134
Term of patent 14 years
U.S. Cl. D24—26

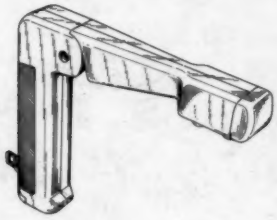
290,400
REAGENT VESSEL
Peter P. Tong, Redlands, Calif., assignor to Kone Instruments Inc., Milton, Wis.
Filed Dec. 19, 1984, Ser. No. 683,721
Term of patent 14 years
U.S. Cl. D24—29



290,401
MODULE HOLDER FOR TEST TUBES
Rune Björkman, Bälinge, Sweden, assignor to Pharmacia AB, Sweden
Filed Jun. 25, 1984, Ser. No. 624,112
Claims priority, application Sweden, Dec. 28, 1983, 83-3434
Term of patent 14 years
U.S. Cl. D24—32



290,402
COMBINED ELECTRIC KNEADER AND VIBRATORY MASSAGER
Mitsuyoshi Osawa, Gunma, Japan, assignor to Ichikawa Press Industry Co., Ltd., Japan
Filed Dec. 28, 1984, Ser. No. 687,280
Claims priority, application Japan, Aug. 23, 1984, 59-035242
Term of patent 14 years
U.S. Cl. D24—40

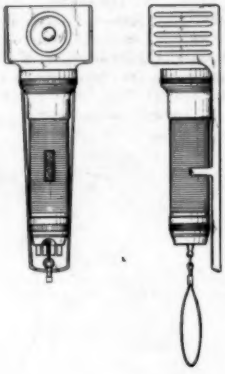


290,403
CATHETER BAG HOLDER
John B. Sink, 3729 Rolling Rd., High Point, N.C. 27260
Filed Nov. 2, 1984, Ser. No. 667,835
Term of patent 14 years
U.S. Cl. D24—58

290,404
SUPPORT POST FOR TAUT-WIRE FENCE
Arie Stoler, Bat Yam, Israel, assignor to Israel Aircraft Industries, Ltd., Lod, Israel
Filed Apr. 10, 1984, Ser. No. 598,704
Claims priority, application Israel, Oct. 10, 1983, 9643
Term of patent 14 years
U.S. Cl. D25—77

290,405
EXTENDED ILLUMINATOR
David L. Johns, Clearwater, Fla., assignor to Suncoast Medical Manufacturing, Inc., Clearwater, Fla.
Filed May 14, 1984, Ser. No. 609,830
Term of patent 14 years
U.S. Cl. D26—37

290,406
COMBINED EMERGENCY FLASHLIGHT AND SMOKE ALARM SYSTEM
Kenneth A. Brown, West Simsbury, Conn., assignor to Second Chance Systems, Inc., North Haven, Conn.
Filed Oct. 29, 1984, Ser. No. 665,742
Term of patent 14 years
U.S. Cl. D26—38

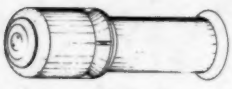


290,407
COMBINED MULTI-PURPOSE LANTERN AND ADJUSTABLE STAND THEREFOR
John S. Yuen, Kowloon, Hong Kong, assignor to John Manufacturing Limited, Kowloon, Hong Kong
Filed Oct. 31, 1984, Ser. No. 666,639
Claims priority, application United Kingdom, May 11, 1984, 1 019 578
Term of patent 14 years
U.S. Cl. D26—42

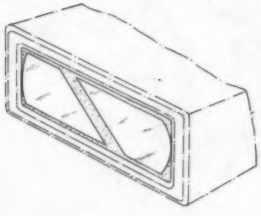
290,408
LUMINAIRE
William T. Gendron, San Ramon; William J. Rapp, Hayward; Frederic L. Green, San Leandro; Katsuhiro Unoki, El Cerrito, and Robert J. Gaskins, Pleasanton, all of Calif., assignors to Gardco Manufacturing, Inc., San Leandro, Calif.
Filed Oct. 15, 1984, Ser. No. 662,457
Term of patent 14 years
U.S. Cl. D26—67

290,409
LUMINAIRE
William T. Gendron, San Ramon; William J. Rapp, Hayward; Frederic L. Green, San Leandro; Katsuhiro Unoki, El Cerrito, and Robert J. Gaskins, Pleasanton, all of Calif., assignors to Gardco Manufacturing, Inc., San Leandro, Calif.
Filed Oct. 15, 1984, Ser. No. 662,458
Term of patent 14 years
U.S. Cl. D26—67

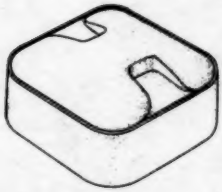
290,410
ILLUMINATED STREET BOLLARD OR THE LIKE
Robert E. Haggard, Snohomish, Wash., assignor to Merry Haggard, Snohomish, Wash.
Filed Jun. 1, 1984, Ser. No. 616,458
Term of patent 14 years
U.S. Cl. D26—68



290,411
LENS FOR A VEHICLE LIGHT
Harold A. Caine, Oceanside, N.Y.
Filed Apr. 8, 1986, Ser. No. 850,897
Term of patent 14 years
U.S. Cl. D26—120

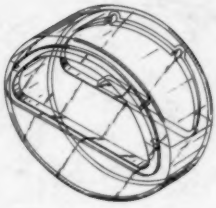


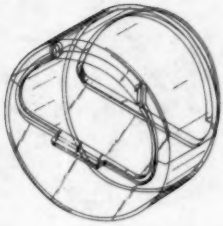
290,412
PHARMACEUTICAL TABLET
Stephen C. Downs, New Fairfield, Conn., assignor to USV Pharmaceutical Corp., Tarrytown, N.Y.
Filed Sep. 13, 1984, Ser. No. 649,884
Term of patent 14 years
U.S. Cl. D28—2



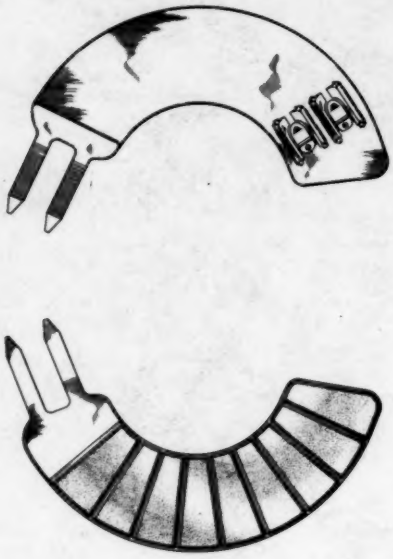
290,413
CAGE MOUNTED POULTRY WATERING UNIT
Eldon Hostetler, Middlebury, Ind., assignor to Ziggity Systems, Inc., Middlebury, Ind.
Filed Jan. 2, 1985, Ser. No. 688,363
Term of patent 14 years
U.S. Cl. D30—14

290,414
WINDOW BIRD FEEDER
William C. Gerber, Wooster, Ohio, assignor to Rubbermaid Incorporated, Wooster, Ohio
Filed Sep. 28, 1984, Ser. No. 655,600
Term of patent 14 years
U.S. Cl. D30—18



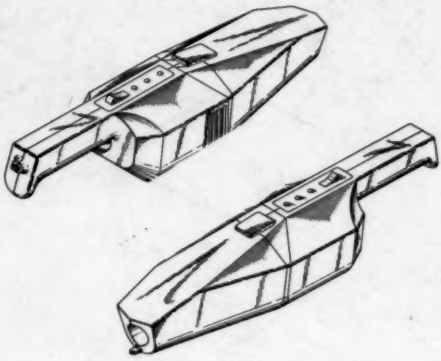


290,415
BELL BOOT FOR HORSE'S HOOF
Dolph G. Hoyt, Jr., Los Angeles, Calif., assignor to Principle Plastics, Gardena, Calif.
Filed Sep. 24, 1984, Ser. No. 653,132
Term of patent 14 years
U.S. Cl. D30—34

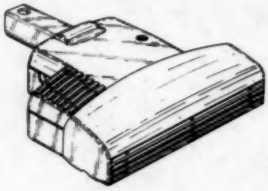


290,416
PICK-UP UNIT FOR ANIMAL DROPPINGS
Thomas A. Breuer, Buffalo, Minn., assignor to Crosslink Plastics, Inc., Buffalo, Minn.
Filed Sep. 16, 1985, Ser. No. 776,526
Term of patent 14 years
U.S. Cl. D30—99

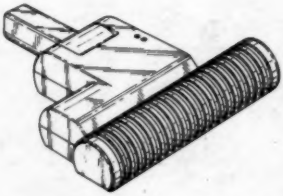
290,417
VACUUM CLEANER
Chung S. Leung, Tsuen Wan, Hong Kong, assignor to Foster Industries Company Limited, Tsuen Wan, Hong Kong
Filed Aug. 14, 1984, Ser. No. 640,599
Claims priority, application United Kingdom, Jun. 26, 1984, 1 020 520
Term of patent 14 years
U.S. Cl. D32—18



290,418
CARPET BRUSH
Rolf Strohmeyer, Wuppertal, Fed. Rep. of Germany, assignor to Vorwerk & Co. Elektrowerke KG., Wuppertal, Fed. Rep. of Germany
Filed Dec. 19, 1984, Ser. No. 683,707
Term of patent 14 years
U.S. Cl. D32—32



290,419
CARPET BRUSH
Rolf Strohmeyer, Wuppertal, Fed. Rep. of Germany, assignor to Vorwerk & Co. Elektrowerke KG., Wuppertal, Fed. Rep. of Germany
Filed Dec. 19, 1984, Ser. No. 683,706
Term of patent 14 years
U.S. Cl. D32—32



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 16TH DAY OF JUNE, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Ahlstrom Corporation: *See*—
Engstrom, Folke; and Sarkki, Juha, 4,672,918, Cl. 122-4.00D.

AB Asea-Atom: *See*—
Pajes, Chajkiel, 4,673,001, Cl. 138-93.000.

AB Hydro Betong: *See*—
Georgii, Hans C., 4,673,453, Cl. 156-256.000.

AB Volvo: *See*—
Bos, Frans, 4,672,714, Cl. 16-262.000.

Abduganiev, Aburakhim; Zhigalov, Gennady V.; and Batalkina, Tatyana M., to Tashkentskoe Spetsialnoe Konstruktorskoe Bjuro Textilnykh Mashin. Apparatus for producing two-component thread. 4,672,001, Cl. 57-86.000.

Abe, Fumio; Hasegawa, Hiroshi; Fujita, Tadashi; and Maeda, Makoto, to NGK Insulators, Ltd. High temperature surface combustion burner. 4,673,349, Cl. 431-328.000.

Abe, Iwao: *See*—
Suyama, Hideo; Imakoshi, Shigeyoshi; Soda, Yutaka; Fuse, Takeyuki; Abe, Iwao; and Wakabayashi, Noboru, 4,673,999, Cl. 360-125.000.

Abe, Kazuo: *See*—
Yokoi, Tatsuhisa; Takeya, Eisaku; Hattori, Kyo; Abe, Kazuo; and Osawa, Hideyuki, 4,672,939, Cl. 123-568.000.

Abe, Kunihiro, to Fuji Jukogyo Kabushiki Kaisha. Intake air control system for an automotive engine. 4,672,935, Cl. 123-339.000.

Abe, Kunihiro, to Fuji Jukogyo Kabushiki Kaisha. Intake air control system for an automotive engine. 4,672,936, Cl. 123-239.000.

Abe, Takao: *See*—
Koshizuka, Kunihiro; Abe, Takao; Kitamura, Shigehiro; and Watanabe, Hiroshi, 4,673,618, Cl. 428-336.000.

Abell, Kathleen A.: *See*—
Boyd, James B.; and Abell, Kathleen A., 4,673,195, Cl. 280-801.000.

Abiko, Tetsuo: *See*—
Sugiyama, Yoshihiko; Nanba, Keizo; Hagiwara, Michiki; Aoki, Takeshi; Iwasaki, Shosuke; and Abiko, Tetsuo, 4,673,551, Cl. 420-535.000.

Abo, Toshimi; and Ueno, Takashi, to Nissan Motor Co., Ltd. Method and apparatus for controlling supercharge pressure for a turbocharger. 4,672,814, Cl. 60-602.000.

Abraham, Joseph: *See*—
Nuns, Jacques; and Abraham, Joseph, 4,673,781, Cl. 219-10.49R.

Abramczyk, Richard F.: *See*—
Harris, Richard M.; Valek, David A.; Toth, James M.; and Abramczyk, Richard F., 4,673,879, Cl. 324-240.000.

Acher, Jacques: *See*—
Thominet, Michel; Acher, Jacques; and Monier, Jean-Claude, 4,673,686, Cl. 514-359.000.

Achia, Biddanda U.: *See*—
Bristow, Duncan J.; Achia, Biddanda U.; and Evers, Lawrence J., 4,673,485, Cl. 208-86.000.

Ackley, E. Michael. Apparatus for conveying and marking pellet-shaped articles. 4,672,892, Cl. 101-35.000.

Actief N.V. ABN Trust Company (Curacao) N.V.: *See*—
Provost, George A., 4,672,721, Cl. 24-442.000.

Adachi, Nobuo: *See*—
Mochida, Yoshihiro; Adachi, Nobuo; and Shirahama, Ichiro, 4,673,294, Cl. 356-381.000.

Adams, Cedric: *See*—
Curtin, William J.; Adams, Cedric; and Soto, Stephen H., 4,674,116, Cl. 379-211.000.

Adeka Argus Chemical Co., Ltd.: *See*—
Minagawa, Motonobu; Nakahara, Yutaka; Shibata, Toshihiro; and Arata, Ryozo, 4,673,701, Cl. 524-99.000.

Adi Limited: *See*—
De Garie, Claude; Cocci, Albert; and Landine, Robert C., 4,672,691, Cl. 4-499.000.

Adler, Robert; and Jarosz, John M., to Zenith Electronics Corporation. Light guide having focusing element and internal reflector on same face. 4,673,918, Cl. 340-365.00P.

Adolfsson, Rune, to SKF Nova AB. Friction coating for contacting elements of a constant velocity joint. 4,673,375, Cl. 464-145.000.

Adolph Coors Company: *See*—
Bader, James S., 4,673,104, Cl. 221-261.000.

Adret Electronique: *See*—
Remy, Joel, 4,673,891, Cl. 331-2.000.

Advanced Nuclear Fuels Corporation: *See*—
Cooke, William R.; Haugen, Brian G.; and Reparaz, Adolfo, 4,673,545, Cl. 376-261.000.

Advanced Systems Research, Inc.: *See*—
Redmond, Kevin P., 4,673,898, Cl. 333-109.000.

Agency of Industrial Science and Technology: *See*—
Watanabe, Takahiko; Sugano, Toshiyuki; Yamamoto, Yasushi; and Murayama, Kunihiko, 4,673,541, Cl. 264-25.000.

Agfa Gevaert Aktiengesellschaft: *See*—
Koepke, Gunther; Frenken, Hans; and Friedsam, Josef, 4,673,782, Cl. 219-10.55M.

Agostini, Louis P. C., to Staar S. A. Automatic disc loading and unloading mechanism for record player apparatus. 4,674,079, Cl. 369-77.100.

Ahlberg, Russell W. Protective bar assembly for motorcycle. 4,673,190, Cl. 280-289.00G.

Aida, Satoru: *See*—
Ono, Shuichi; Aida, Satoru; and Hoshino, Kinshiro, 4,672,796, Cl. 53-449.000.

Aihara, Yoshihiko: *See*—
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Air, Ltd.: *See*—
May, Michael G., 4,673,455, Cl. 156-294.000.

Air Products and Chemicals, Inc.: *See*—
Iacoviello, John G., 4,673,702, Cl. 524-459.000.
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Aisin Seiki Kabushiki Kaisha: *See*—
Murakami, Yuichi; and Yamamoto, Tomohiro, 4,673,832, Cl. 307-326.000.
Naruse, Yoshihiro, 4,674,073, Cl. 367-105.000.

Aisin-Warner Limited: *See*—
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Ajinomoto Co., Inc.: *See*—
Hisamitsu, Kunio; Takemoto, Tadashi; Yukawa, Toshihide; and Hisamitsu, Kunio, 4,673,744, Cl. 544-385.000.

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Akademie der Deutschen Demokratischen Republik: *See*—
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Akami, Ichio: *See*—
Kogure, Tsuneo; Tsuchiyama, Yuji; Amano, Tadashi; Takahashi, Hideaki; Sekita, Katsuji; and Akami, Ichio, 4,672,831, Cl. 72-21.000.

Akasaka, Tamotsu; Tomiuchi, Shinichi; Seto, Kazuo; Matsui, Kenichi; and Sawada, Yasushi, to Matsushita Electric Works, Ltd. Method of producing hardened inorganic products. 4,673,543, Cl. 264-82.000.

Akerblom, Bengt O.: *See*—
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Akiba, Yuichi: *See*—
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Akita, Shigeyuki; and Kago, Yoshiyuki, to Nippon Soken, Inc. Zigzag running warning system for automotive vehicles. 4,673,913, Cl. 340-52.00R.

Akiyama, Tsutomu; and Kobayashi, Toshiyuki, to Mitsuba Electric Manufacturing Co., Ltd. Motor with integral bracket brush holder. 4,673,836, Cl. 310-239.000.

Akiyoshi, Mitsuo: *See*—
Hirai, Kazumi; Akiyoshi, Mitsuo; Nakano, Chikao; Watanabe, Kenji; and Kodama, Satoru, 4,673,800, Cl. 219-518.000.

Akutagawa, Hitoshi, to Mazda Motor Corporation. Belt-pulley type steplessly variable transmission having a reverse drive gear mechanism. 4,673,377, Cl. 474-1.000.

AKZO NV: *See*—
Henne, Werner; and Pelger, Michael, 4,673,506, Cl. 210-636.000.

Alberto, Scoti. Method for making extended heat transfer surfaces and a tool for putting said method into practice. 4,672,834, Cl. 72-325.000.

Albright & Wilson Limited: *See*—
Davis, Keith P.; and Talbot, Robert E., 4,673,509, Cl. 210-699.000.

Alessi Industries, Inc.: *See*—
Hunt, Gary D.; and Gilles, Helmut, 4,673,261, Cl. 350-531.000.

Alexander, James; and Bronander, Wilhelm B., III, to Scandia Packaging Machinery Co. Method of handling fifth panel packages and assembly therefor. 4,672,795, Cl. 53-446.000.

Alfer, Jaroslaw G. Basic lotus posture comfort seat. 4,673,216, Cl. 297-452.000.

Alfredsson, Alf I., to Victor Hasselblad AB. Mechanism in single-lens reflex cameras. 4,673,271, Cl. 354-152.000.

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Slifkin, Malcolm, 4,673,639, Cl. 435-36.000.

Allen, Richard C.: *See*—
Shutske, Gregory M.; Setescak, Linda L.; and Allen, Richard C., 4,673,746, Cl. 546-272.000.

Allenbaugh, Howard M., to M.A.G. Engineering & Mfg. Co., Inc. Interlocking protective door shield. 4,673,204, Cl. 292-346.000.

Allied Colloids Limited: *See—*
Flesher, Peter; and Farrar, David, 4,673,704, Cl. 524-519.000.
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Allied Corporation: *See—*
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Sears, Jerome; Parfomak, Walter; and Kluss, Walter, 4,673,849, Cl. 318-272.000.

Allington, Robert W.; and Hull, John D., to Isco, Inc. Peristaltic pump. 4,673,334, Cl. 417-53.000.

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Syrigos, Harry, 4,673,945, Cl. 343-755.000.

Alps Electric Co., Ltd.: *See—*
Oyama, Minoru; and Kinugawa, Ryoji, 4,674,008, Cl. 361-417.000.
Tadachi, Akio; and Takayama, Akira, 4,673,895, Cl. 331-99.000.
Tsushima, Noburu; Fuse, Masashi; Mimori, Teruo; Sasaki, Toshio; and Mukai, Tadashi, 4,673,878, Cl. 324-226.000.

Alreed Teves GmbH: *See—*
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Alza Corporation: *See—*
Guittard, George V.; Deters, Joseph C.; Theeuwes, Felix; and Cortese, Richard, 4,673,405, Cl. 604-890.000.

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Konno, Masanori; Imai, Kiyoshi; and Dobashi, Toshihiro, 4,673,791, Cl. 219-69.00M.

Amano, Tadashi: *See—*
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Ambal, Gilbert, to I.T.W. de France. Releasable assembly for connecting bag members. 4,673,070, Cl. 190-108.000.

Ameda AG: *See—*
Schlenzer, Klaus; Beer, Christian; and Riedweg, Robert, 4,673,388, Cl. 604-74.000.

American Cyanamid Company: *See—*
Bambrick, William E., 4,673,664, Cl. 502-439.000.

American Microsystems, Inc.: *See—*
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American Multimedia, Inc.: *See—*
Kincheloe, David W.; and Clark, Richard L., 4,673,992, Cl. 360-15.000.

American Telephone and Telegraph Co.: *See—*
Aranguren, William L.; Restrepo, Mario A.; and Sidey, Michael J., 4,674,085, Cl. 370-85.000.

American Television & Communications Corporation: *See—*
Wreford-Howard, David, 4,673,976, Cl. 358-10.000.

American Trading and Production Corporation: *See—*
Grote, Warren; and Leu, Frederick R., 4,673,149, Cl. 248-343.000.

Amey, Jeffrey: *See—*
Larkin, Francis; and Amey, Jeffrey, 4,674,060, Cl. 364-567.000.

Ameyama, Minoru; Isayama, Takuro; Yamazaki, Hiroshi; Matsumoto, Shuzo; Katano, Yasuo; and Iwasaki, Kyuhachiro, to Ricoh Company, Ltd. Ink receptacle for ink jet printer. 4,673,955, Cl. 346-140.00R.

AMF, Inc.: *See—*
Storace, Anthony; and Yanneila, Albert V., 4,672,750, Cl. 33-199.00R.
Vigg, Peter, 4,672,982, Cl. 131-290.000.

Amikura, Takashi; and Fujiwara, Akihiro, to Canon Kabushiki Kaisha. Automatic focus adjusting device. 4,673,806, Cl. 250-201.000.

Ammermann, Eberhard: *See—*
Buschmann, Ernst; Schuster, Ludwig; Goetz, Norbert; Pommer, Ernst-Heinrich; and Ammermann, Eberhard, 4,673,683, Cl. 514-317.000.

Amoco Corporation: *See—*
Hoofnagle, Rodger A.; and Young, William S., 4,673,500, Cl. 210-307.000.
Nimry, Tayseer S.; and De Simone, Richard E., 4,673,767, Cl. 585-467.000.
Standley, Robert W., 4,673,589, Cl. 427-41.000.

AMP Incorporated: *See—*
Gingerich, David J.; Granitz, Richard F.; Rose, William H.; and Shaffer, David T., 4,673,837, Cl. 310-239.000.
Gordon, Eugene I., 4,673,270, Cl. 350-96.150.

Ampe, Frank: *See—*
Rosseel, Rik; Decock, Bernard; Wyffels, Marc; and Ampe, Frank, 4,673,004, Cl. 139-435.000.

Amtelco: *See—*
Curtin, William J.; Adams, Cedric; and Soto, Stephen H., 4,674,116, Cl. 379-211.000.

Anahara, Meiji; Muramatsu, Shigeru; Takagi, Isamu; and Tuboi, Masayoshi, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Friction spinning apparatus. 4,672,804, Cl. 57-401.000.

Anazawa, Osamu: *See—*
Kurosawa, Akihito; and Anazawa, Osamu, 4,673,105, Cl. 221-281.000.

Anderson, Daryl R. Enclosure cabinet for outdoor-use devices. 4,673,227, Cl. 312-100.000.

Anderson, David M.: *See—*
McStravick, David M.; Chenoweth, David V.; and Anderson, David M., 4,673,652, Cl. 436-2.000.

Anderson-Greenwood USA, Inc.: *See—*
Powell, Walter W., 4,672,995, Cl. 137-489.000.

Anderson, Harry E.; and Heasley, Raymond E. Apparatus for placing point supports on a metal cutting table. 4,673,103, Cl. 221-186.000.

Anderson, John. Caulking forming tool. 4,673,346, Cl. 425-458.000.

Anderson, Porter W. Immunogenic conjugates. 4,673,574, Cl. 424-92.000.

Anderson, Richard N., to Hunter Douglas Inc. Honeycomb structure. 4,673,600, Cl. 428-12.000.

Andersson, Kurt G. Arrangement for the manufacture of an elongated organ. 4,673,345, Cl. 425-174.80R.

Ando, Reigo: *See—*
Yoshimoto, Shin-ichi; Ando, Reigo; Shirai, Takeshi; and Nomura, Hiroshi, 4,674,077, Cl. 369-37.000.

Ando, Takao: *See—*
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,673,669, Cl. 514-42.000.

Andreas Stihl: *See—*
Wissmann, Michael; Nickel, Hans; and Weber, Jurgen, 4,672,929, Cl. 123-179.00G.

Andreasson, Olof I. Chain net. 4,673,015, Cl. 152-231.000.

Andrew Wilson Company: *See—*
Robinson, Hugh A., 4,673,091, Cl. 211-184.000.

Ang, Peter G. P.; and Sammells, Anthony F., to PA Ang, Peter G. Means and method for reducing carbon dioxide to a product. 4,673,473, Cl. 204-59.00R.

Angerstein, Jorg; Wagner, Elmar; and Dermitzakis, Stefanos, to Telefunken electronic GmbH. Circuit arrangement for actuating semiconductor lasers. 4,674,093, Cl. 372-38.000.

Ansel, Robert E.; and Murray, Kevin P., to DeSoto, Inc. Radiation-curable coatings containing reactive pigment dispersants. 4,673,705, Cl. 524-850.000.

Anton Piller GmbH & Co. KG: *See—*
Sachs, Klaus, 4,674,021, Cl. 363-56.000.

Anzola, Michel; Lefevre, Daniel; Massicot, Patrick; Pierre, Jacques; and Henry, Antoine, to Commissariat a l'Energie Atomique. Process for the preparation of the surface of uranium or uranium-based alloy parts. 4,673,585, Cl. 427-6.000.

Aoki, Osamu: *See—*
Nakayama, Hajime; Aoki, Osamu; Nishijima, Shigetoshi; Horiuchi, Haruo; Sugino, Takuya; and Takagi, Shuichi, 4,672,940, Cl. 123-590.000.

Aoki, Takeshi: *See—*
Sugiyama, Yoshihiko; Nanba, Keizo; Hagiwara, Michiki; Aoki, Takeshi; Iwasaki, Shosuke; and Abiko, Tetsuo, 4,673,551, Cl. 420-535.000.

Aota, Katsumi: *See—*
Tanabe, Hiroshi; Yamamoto, Etsuo; Togashi, Seigo; Sekiguchi, Kanetaka; Aota, Katsumi; and Sorimachi, Kazuaki, 4,673,253, Cl. 350-339.00F.

Aoyama, Hirokazu: *See—*
Fukui, Shosin; Shinjo, Masayoshi; Aoyama, Hirokazu; Okazaki, Yasuko; Enjo, Naonori; and Hayashi, Kazunori, 4,673,712, Cl. 526-253.000.

Aplan, Frank F.: *See—*
Datta, Rabinder S.; Aplan, Frank F.; and Zebula, Charles, 4,673,133, Cl. 241-19.000.

Appleton, James K.: *See—*
Lemon, Chester L.; and Kelly, Bill A., 4,674,041, Cl. 364-401.000.

Arai, Jun-ichiro: *See—*
Wakabayashi, Toshio; Takai, Makoto; Ichikawa, Shuji; Arai, Jun-ichiro; and Murota, Seiitsu, 4,673,684, Cl. 514-327.000.

Arai, Yoshihiro: *See—*
Shirahata, Ryuji; Arai, Yoshihiro; and Yasunaga, Tadashi, 4,673,610, Cl. 428-213.000.

Arai, Yuko: *See—*
Tomohiro, Susumu; Arai, Yuko; and Mineura, Kazuyuki, 4,673,645, Cl. 435-119.000.

Aranguren, William L.; Restrepo, Mario A.; and Sidey, Michael J., to American Telephone and Telegraph Co.; and AT&T Information Systems Inc. Local area network. 4,674,085, Cl. 370-85.000.

Arao, Kozo: *See—*
Katagiri, Kazuhara; Oguchi, Yoshihiro; Ohtake, Takeshi; Arao, Kozo; Kitahara, Makoto; and Takasu, Yoshio, 4,673,630, Cl. 430-72.000.

Arata, Ryozo: *See—*
Minagawa, Motonobu; Nakahara, Yutaka; Shibata, Toshihiro; and Arata, Ryozo, 4,673,701, Cl. 524-99.000.

Arbeiter, James H.: *See—*
Carlson, Curtis R.; Arbeiter, James H.; and Bessler, Roger F., 4,674,125, Cl. 382-49.000.

Archibald, G. Kent; and Slaker, Frank A., to Minnesota Mining and Manufacturing Company. Sequence valve for piggyback IV administration. 4,673,389, Cl. 604-81.000.

Archibald, G. Kent, to Minnesota Mining & Manufacturing Company. Multiple solution IV system. 4,673,390, Cl. 604-81.000.

Ardo, Ronald: *See—*
Graham, Lawrence D.; Skelley, Richard A.; Fetsko, Daniel G.; and Ardo, Ronald, 4,673,021, Cl. 164-122.000.

Arguin, Gerard, to Arguin Trailer Frames, Inc. Tandem trailer system. 4,673,191, Cl. 280-408.000.

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Arguin, Gerard, 4,673,191, Cl. 280-408.000.

Ariizumi, Shoji; and Segawa, Makoto, to Kabushiki Kaisha Toshiba. Semiconductor device having multiple conductive layers and the

method of manufacturing the semiconductor device. 4,673,969, Cl. 357-71.000.

Arimatsu, Keiji: *See*—
Setoyama, Eiji; Arimatsu, Keiji; and Ohshita, Youichi, 4,673,482, Cl. 204-298.000.

Arita, Setsuo: *See*—
Ito, Tetsuo; Arita, Setsuo; and Kitaura, Wataru, 4,673,974, Cl. 358-108.000.

Arnone, Louis F., III: *See*—
Schlueter, Gary R.; Kettlitz, Karsten K.; and Arnone, Louis F., III, 4,672,718, Cl. 24-90.00A.

Arszman, Jerrold H.: *See*—
Betts, Robert E.; and Arszman, Jerrold H., 4,672,881, Cl. 89-1.816.

Arthroplasty Research & Development (Pty) Ltd.: *See*—
Grobbelaar, Charl J., 4,673,408, Cl. 623-20.000.

ARTOS Engineering Company: *See*—
Gudmestad, Ragnar, 4,672,871, Cl. 83-151.000.

Artz, Glen D.; and Grant, Louis R., to United States of America, Army. Solid H_2/D_2 gas generators. 4,673,528, Cl. 252-188.250.

Aruga, Masayoshi: *See*—
Kawata, Hiroitsu; Aruga, Masayoshi; Ohmura, Tadayoshi; Sonobe, Takashi; Yoneya, Satoru; and Sone, Chiharu, 4,673,564, Cl. 424-494.000.

Asada, Koichi, deceased: *See*—
Tsukamoto, Hidehiko; Kohmoto, Eiji; Asada, Koichi, deceased; Yamasaki, Masakuni; Matsumoto, Kenichi; Nakazono, Euji; Wakamiya, Yoshinori; and Kuramoto, Satoru, 4,672,830, Cl. 72-8.000.

Asada, Kuniko, legal representative: *See*—
Tsukamoto, Hidehiko; Kohmoto, Eiji; Asada, Koichi, deceased; Yamasaki, Masakuni; Matsumoto, Kenichi; Nakazono, Euji; Wakamiya, Yoshinori; and Kuramoto, Satoru, 4,672,830, Cl. 72-8.000.

Asahi Glass Company, Ltd.: *See*—
Senoue, Makoto; Terase, Kunihiko; and Nakaya, Keiichi, 4,673,558, Cl. 423-240.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Katohno, Takashi; and Koyama, Ryouhei, 4,673,808, Cl. 250-231.0SE.
Kishimoto, Yasushi; and Masubuchi, Tetsuo, 4,673,714, Cl. 525-314.000.

Asahina, Hiroshi; and Ogura, Ichiro, to Kabushiki Kaisha Toshiba. Digital X-ray medical diagnostic apparatus. 4,674,108, Cl. 378-99.000.

Asai, Koetsu, to Mitsubishi Jukogyo Kabushiki Kaisha. Freight carrier's hull construction for carrying cryogenic or high temperature freight. 4,672,906, Cl. 114-74.00A.

Asakura, Hiroyuki: *See*—
Nagaoka, Yoshitomi; Matsuda, Yoshiteru; Hirao, Yoshiaki; Kuga, Ryuichiro; and Asakura, Hiroyuki, 4,673,274, Cl. 354-403.000.

Asao, Yasuzi: *See*—
Kunichika, Kenji; Kagawa, Yoshikatsu; Ohishi, Chikashi; Nakao, Sho; and Asao, Yasuzi, 4,673,627, Cl. 430-49.000.

Ashe, James A.: *See*—
Turner, Kenneth R.; and Ashe, James A., 4,673,398, Cl. 604-264.000.

Ashland Oil, Inc.: *See*—
Tsai, Chung-Chieh, 4,673,696, Cl. 521-172.000.

Asmo Co., Ltd.: *See*—
Tsunoda, Akira; Tanaka, Takahiko; and Handa, Noboru, 4,673,853, Cl. 318-443.000.

Assaf, Gad; and Regev, Mordechai, to Solmat Systems Ltd. Method of and apparatus for protecting a halocline in a salt-water solar pond against the effects of wind. 4,672,950, Cl. 126-452.000.

Astra Meditec AB: *See*—
Nygren, Bo H.; and Stenberg, Johan E., 4,673,584, Cl. 427-2.000.

AT&T Information Systems Inc.: *See*—
Aranguren, William L.; Restrepo, Mario A.; and Sidey, Michael J., 4,674,085, Cl. 370-85.000.

AT&T Technologies Inc. and AT&T Bell Laboratories: *See*—
Crouch, Paul E.; Nahas, Joseph J.; and Ng, Howard, 4,674,114, Cl. 379-154.000.

Atherton, Jay W., to Honeywell Inc. Digital driver for fixed power amplifier. 4,673,887, Cl. 330-10.000.

Atkins, Kenneth E., to Union Carbide Corporation. Polyester molding compositions. 4,673,706, Cl. 525-31.000.

Atkins, Thomas M.: *See*—
Every, Peter; Atkins, Thomas M.; Miller, Roger L.; and Tribe, Leonard T., 4,673,226, Cl. 303-109.000.

Atlantic Richfield Company: *See*—
Meyer, Bernard H.; DiGiulio, Adolph V.; Kimlow, Joseph C.; and Hajnik, Dennis M., 4,673,694, Cl. 521-59.000.

ATOCHEM: *See*—
Cuzin, Daniel, 4,673,723, Cl. 528-113.000.

Aubert, James H.; Clough, Roger L.; Curro, John G.; Quintana, Carlos A.; Russick, Edward M.; and Shaw, Montgomery T., to United States of America, Energy. Low density microcellular foams. 4,673,695, Cl. 521-64.000.

August Bilstein GmbH & Co. KG: *See*—
Munning, Hans; Bock, Jurgen; Oldach, Bernd; Ladic, Josef; Rauert, Max-Otto; Emde, Hugo; Petzsch, Dietrich; and de Baan, Johannes J., 4,673,067, Cl. 188-299.000.

Aungst, Bruce J.; and Hussain, Munir A., to Du Pont de Nemours, E. I., and Company. Use of prodrugs of 3-hydroxymorphinans to prevent bitter taste upon buccal, nasal or sublingual administration. 4,673,679, Cl. 514-282.000.

Aurousseau, Michel E.: *See*—
Robba, Max F.; and Aurousseau, Michel E., 4,673,675, Cl. 514-252.000.

Ausnit, Steven: *See*—
Hugues, Gilbert P. J. M.; and Ausnit, Steven, 4,672,723, Cl. 24-587.000.

Automax Kabushiki-Kaisha: *See*—
Okumura, Katsuji, 4,674,048, Cl. 364-424.000.

Autotrol Corporation: *See*—
Goudy, Paul R., Jr.; Cassedy, Linn W.; and Whitaker, Thomas S., 4,673,527, Cl. 252-181.000.

Avco Corporation: *See*—
Rokni, Mordechai; and Flusberg, Allen M., 4,673,257, Cl. 350-354.000.

Awdhan, Deo P., to Reeves Brothers, Inc. Method of making foam mattress. 4,673,452, Cl. 156-254.000.

B-Art S.a.s.: *See*—
Biagini, Livio, 4,672,931, Cl. 123-193.00P.

Baarsch, Kurt: *See*—
Klauss, Heinrich; and Baarsch, Kurt, 4,673,538, Cl. 261-112.000.

Babcock, Robert E.; Beaver, W. Hardey; and Wood, F. Dianne, to Diversified Petroleum Recovery, Inc. Amphiphilic phase behavior separation of carboxylic acids/hydrocarbon mixtures in recovery of oil from tar sands or the like. 4,673,484, Cl. 208-435.000.

Babcock & Wilcox Company, The: *See*—
Casteen, Lynn A.; Gilbert, Kim T.; Patel, Raj L.; and Snoke, Steven R., 4,673,546, Cl. 376-289.000.
Merker, David E., 4,672,832, Cl. 72-62.000.

Baber, Samuel C.: *See*—
Porter, Vernon R.; and Baber, Samuel C., 4,673,592, Cl. 427-53.100.

Babsch, Alfred; Beth, Dieter; Panzer, Werner; and Stempfle, Johann, to Mannesmann AG. Increment sensing with three beam mark detection. 4,673,810, Cl. 250-231.0SE.

Bachinger, Peter; and Giancarlo, Mondini, to Maschinenfabrik Rieter AG. Method of and apparatus for forming a wadding lap. 4,673,137, Cl. 242-55.100.

Bachtiger, Rolf, to Siemens-Albis Aktiengesellschaft. Circuit arrangement for the regulation of a multichannel pulse compression system. 4,674,104, Cl. 375-37.000.

Bachynsky, Nicholas, to Bachynsky, Nicholas. Human weight loss inducing method. 4,673,691, Cl. 514-567.000.

Backman, Keith C., to Biotechnica International, Inc. Regulated protein production using site-specific recombination. 4,673,640, Cl. 435-68.000.

Badders, Edwin T. Back flow prevention valve. 4,672,991, Cl. 137-218.000.

Bader, James S., to Adolph Coors Company. Molded clip reorienter and applicator. 4,673,104, Cl. 221-261.000.

Badin Crouzet: *See*—
Gohin, Christian; and Leblond, Henri, 4,672,848, Cl. 73-505.000.

Badin Crouzet Aerodrom de Toussus-le-Noble: *See*—
LeBlond, Henri; and Cabot, Louis, 4,672,846, Cl. 73-180.000.

Badouard, Michel; Durame, Claude; and Pade, Bernard, to Legrand. Package with peel-off film closure. 4,673,085, Cl. 206-459.000.

Bagan, James E.: *See*—
Becker, Amy J.; Bagan, James E.; and Medri, Mario W., 4,673,578, Cl. 426-93.000.

Bahrmann, Helmut; Cornils, Boy; Lipps, Wolfgang; Lappe, Peter; and Springer, Helmut, to Ruhrchemie Aktiengesellschaft. Quaternary ammonium salts of sulfonated triarylphosphines and process for the production thereof. 4,673,535, Cl. 260-501.150.

Bai, Monty W.; Titus, John D.; and Farace, Louis P., to Motorola, Inc. Microbeam sensor contact damper. 4,673,777, Cl. 200-61.45R.

Bailly, Jean C., to BP Chemicals Limited. Catalysts for the polymerization and copolymerization of propylene and polymerization processes using these catalysts. 4,673,662, Cl. 502-115.000.

Bain, John H., Jr.: *See*—
Gentry, Gene E.; and Bain, John H., Jr., 4,673,934, Cl. 342-8.000.

Baker Aktiengesellschaft: *See*—
Meixner, Jurgen; Muller, Manfred; and Kremer, Wolfgang, 4,673,758, Cl. 560-90.000.

Baker Oil Tools, Inc.: *See*—
McStravick, David M.; Chenoweth, David V.; and Anderson, David M., 4,673,652, Cl. 436-2.000.

Baker, Stephen B.: *See*—
Rubinstein, Stanley; and Baker, Stephen B., 4,673,306, Cl. 400-618.000.

Balz, Werner: *See*—
Lehner, August; Heil, Guenter; Lenz, Werner; Balz, Werner; Kohl, Albert; and Schornick, Gunnar, 4,673,591, Cl. 427-48.000.

Bambrick, William E., to American Cyanamid Company. Shape for extruded catalyst support particles and catalysts. 4,673,664, Cl. 502-439.000.

Bannai, Saburo; and Kawashima, Kiyoshi, to Toshiba Kikai Kabushiki Kaisha. Control system of injection molding machines. 4,674,053, Cl. 364-476.000.

Barajas, Felix; and Bridges, Donald W., to McDonnell Douglas Corporation. Rosin-free solder composition. 4,673,532, Cl. 252-512.000.

Baran, Patrick S.; Levin, Sandra A.; and Kuna, Wayne A., to Marvin Glass & Associates. Skill action game. 4,673,181, Cl. 273-1.0GC.

Barbee, Troy W., Jr.: *See*—
Gardner, Donald S.; Saraswat, Krishna C.; and Barbee, Troy W., Jr., 4,673,623, Cl. 428-620.000.

Barber-Colman Company: *See*—
Haug, Edward W., 4,673,317, Cl. 407-28.000.

Barkan, Edward D.: *See*—
Shepard, Howard M.; Barkan, Edward D.; and Swartz, Jerome, 4,673,805, Cl. 235-472.000.

Barken, Israel. Apparatus and method for computer controlled laser surgery. 4,672,963, Cl. 128-303.100.

Barker, Barbara A.; Hernandez, Irene H.; and McCaskill, Rex A., to International Business Machines Corporation. Merging of documents. 4,674,040, Cl. 364-300.000.

Barker, Barbara A.: *See*—
Hernandez, Irene H.; Barker, Barbara A.; Himelstein, Carol S.; and Machart, Beverly H., 4,674,042, Cl. 364-401.000.
Hernandez, Irene H.; Barker, Barbara A.; Himelstein, Carol S.; and Machart, Beverly H., 4,674,043, Cl. 364-401.000.

Barley, Thomas A.; Hodgens, Tony D.; and Rast, Gustaf J., Jr., to United States of America, Army. Detection of vibrating target signatures. 4,673,940, Cl. 342-192.000.

Barnes Drill Co.: *See*—
Fox, Robert J., 4,673,502, Cl. 210-413.000.

Barr, J. T.: *See*—
Perciful, David D., 4,673,219, Cl. 299-39.000.

Barrett, John S.: *See*—
Nigol, Olaf; Barrett, John S.; and Green, Martin A., 4,673,775, Cl. 174-130.000.

Barrington, Burchus Q.: *See*—
Copland, George V.; and Barrington, Burchus Q., 4,673,890, Cl. 33-178.00F.

Barsa, John J.: *See*—
Farris, Edward T.; Barsa, John J.; Lagow, Richard J.; and Capano, Paul J., 4,673,355, Cl. 433-218.000.

Barthelmess, Ulrich, to Omya GmbH. Agitating mill, particularly agitating ball mill. 4,673,134, Cl. 241-57.000.

Bartko, Kristine; Gabler, Dieter; Heinrich, Peter; Luckner, Joachim; and Schlenkrich, Bernd, to VEB Kombinat Walzlager und Normteile. Method and apparatus for the two-step rolling of rings. 4,672,833, Cl. 72-111.000.

Bartolini, Dario, to Lovable Industriale S.p.A. Slider for ribbon, particularly for clothing articles, process for assembling thereof and relative apparatus. 4,673,448, Cl. 156-73.100.

Barton, Brian C.: *See*—
Burke, Raymond W.; Tiedke, Herman W. B.; and Barton, Brian C., 4,673,054, Cl. 180-271.000.

Bartylla, James G., to Raymond Production Systems Corporation. Article transport elevator. 4,673,080, Cl. 198-689.100.

BASF Aktiengesellschaft: *See*—
Buschmann, Ernst; Schuster, Ludwig; Goetz, Norbert; Pommer, Ernst-Heinrich; and Ammermann, Eberhard, 4,673,683, Cl. 514-317.000.
Grimmer, Johannes; and Horn, Hans C., 4,673,742, Cl. 544-251.000.
Hamprecht, Gerhard; Rohr, Wolfgang; and Varwig, Juergen, 4,673,740, Cl. 544-92.000.
Lehner, August; Heil, Guenter; Lenz, Werner; Balz, Werner; Kohl, Albert; and Schornick, Gunnar, 4,673,591, Cl. 427-48.000.
Rieber, Norbert; Boehm, Heinrich; Pommer, Ernst-Heinrich; and Dressel, Juergen, 4,673,429, Cl. 71-27.000.
Schuett, Walter, 4,673,083, Cl. 206-387.000.

BASF Corporation: *See*—
Owens, James P.; and Deck, Charles F., 4,673,518, Cl. 252-75.000.

Basiulis, Algerd, to Hughes Aircraft Company. Rechargeable thermal control system. 4,673,030, Cl. 165-32.000.

Batalkina, Tatyana M.: *See*—
Abduganiev, Aburakhim; Zhigalov, Gennady V.; and Batalkina, Tatyana M., 4,672,801, Cl. 57-86.000.

Bator, MaryAnn: *See*—
Gardlund, Zachariah G.; and Bator, MaryAnn, 4,673,722, Cl. 528-73.000.

Bauer, Jerry R., to American Microsystems, Inc. Switch matrix encoding interface using common input/output parts. 4,673,933, Cl. 340-825.940.

Baugh, Benton F.; and Panicker, Narayana N., to Mobil Oil Corporation. Marine production riser and method for installing same. 4,673,313, Cl. 405-195.000.

Baum, Gilbert. Surgical apparatus. 4,672,965, Cl. 128-305.000.

Baumgart, Herbert P. Security device for electrical plug. 4,673,230, Cl. 439-133.000.

Baxter Travenol Laboratories: *See*—
Kamen, Dean L., 4,673,820, Cl. 250-573.000.

Baxter Travenol Laboratories, Inc.: *See*—
Lynn, Kenneth M.; and Rollins, Richard, 4,673,397, Cl. 604-251.000.
Sias, Ralph M.; Hurley, Nancy J.; and Dalebout, Melvin W., 4,673,605, Cl. 428-120.000.

Bayer Aktiengesellschaft: *See*—
Fiedler, Paul; Braden, Rudolf; and Buding, Hartmuth, 4,673,757, Cl. 558-431.000.
Meier, Helmut-Martin; Dhein, Rolf; Winkel, Jens; Klein, Gerhard; and Kloker, Werner, 4,673,713, Cl. 525-278.000.
Nielinger, Werner; Brinkmeyer, Hermann; Binsack, Rudolf; Bottenbruch, Ludwig; and Fullmann, Heinz-Josef, 4,673,728, Cl. 528-339.000.
Schroer, Wolf-Dieter; Muszik, Janos; Cramm, Gunther; and Benn, Otto, 4,673,729, Cl. 528-397.000.

Bayraktaroglu, Burhan, to Texas Instruments Incorporated. Monolithic microwave diodes. 4,673,958, Cl. 357-13.000.

Beach, Sidney C.; and Feilman, Jack D., to McGean-Rohco, Inc. Method of plating plastics. 4,673,469, Cl. 204-38.400.

Beachboard, Stephen A. Zoned heating and air conditioning system. 4,673,029, Cl. 165-22.000.

Beaver, Richard N.: *See*—
Morris, Gregory J. E.; Grosshandler, Sandor; Beaver, Richard N.; Pimlott, John R.; and Dang, Hiep D., 4,673,479, Cl. 204-279.000.

Beaver, W. Hardey: *See*—
Babcock, Robert E.; Beaver, W. Hardey; and Wood, F. Dianne, 4,673,484, Cl. 208-435.000.

Beck, Richard B.: *See*—
Wells, James R.; Portfolio, Donald C.; and Beck, Richard B., 4,673,614, Cl. 428-285.000.

Becker, Amy J.; Bagan, James E.; and Medri, Mario W., to Warner-Lambert Company. Snack food product with high dietary fiber content and process for producing the same. 4,673,578, Cl. 426-93.000.

Beckey, Thomas J., to Honeywell Inc. Thermostat means adaptively controlling the amount of overshoot or undershoot of space temperature. 4,674,027, Cl. 364-143.000.

Beckwith, John R., to General Motors Corporation. Hinge assembly. 4,672,715, Cl. 16-334.000.

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Ferres, Harry; Smith, Richard A. G.; and Garman, Andrew J., 4,673,573, Cl. 424-94.630.

Beer, Christian: *See*—
Schlensog, Klaus; Beer, Christian; and Riedweg, Robert, 4,673,388, Cl. 604-74.000.

Beers, M. Dale; and Thompson, James E., to Loctite Corporation. Auto-adhering one-component RTV silicone sealant composition utilizing glycidoxyalkyl substituted alkoxy-oxime silane as an adhesion promoter. 4,673,750, Cl. 549-215.000.

Beitinger, Eberhard: *See*—
Nussbaumer, Manfred; Glaser, Eberhard; and Beitinger, Eberhard, 4,673,316, Cl. 405-267.000.

Belardinelli, Luiz: *See*—
Berne, Robert M.; Belardinelli, Luiz; and Rubio, Rafael, 4,673,563, Cl. 424-9.000.

Beloit Corporation: *See*—
Roerig, Arnold J.; and Shockley, Steven C., 4,673,461, Cl. 162-205.000.

Bendiberica S.A.: *See*—
Rosell, Jorge E.; and Folch, Carlos M., 4,672,884, Cl. 91-375.00R.

Bendix Electronics S.A.: *See*—
Lacz, Alexandre, 4,674,005, Cl. 361-388.000.

Bendix France: *See*—
Carre, Jean-Jacques; and Levrai, Roland, 4,673,223, Cl. 303-24.00C.
Gerard, Jean-Louis; and Le Marchand, Claude, 4,673,065, Cl. 188-73.380.
Kervagoret, Gilbert, 4,672,885, Cl. 91-450.000.
Pagot, Henry, 4,672,882, Cl. 91-369.00A.

Benn, Otto: *See*—
Schroer, Wolf-Dieter; Muszik, Janos; Cramm, Gunther; and Benn, Otto, 4,673,729, Cl. 528-397.000.

Bennett, Richard W.: *See*—
Turner, Robert B.; Peters, Kenneth D.; and Bennett, Richard W., 4,673,488, Cl. 208-101.000.

Benoit, Alain D.; and Pujol, Serge, to Centre National de la Recherche Scientifique. Dilution cryostat. 4,672,823, Cl. 62-514.00R.

Benoit, Louis; and Nerrinck, Bernard, to Salomon S.A. Unlatching lever and boot having such unlatching lever. 4,672,755, Cl. 36-117.000.

Bentsen, Per, to Minigrip, Incorporated. Fusible rib bonding of fasteners to substrate. 4,673,383, Cl. 493-381.000.

Berchier, Jean-Luc: *See*—
Popovic, Radivoje; Solt, Katalin; and Berchier, Jean-Luc, 4,673,964, Cl. 357-27.000.

Berg, Lloyd; and Yeh, An-I. Separation of m-xylene from o-xylene by extractive distillation with polychloro compounds. 4,673,465, Cl. 203-51.000.

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Bergermann, Rudolf: *See*—
Schlaich, Jorg; and Bergermann, Rudolf, 4,673,309, Cl. 403-265.000.

Bergsten, Lars E.: *See*—
Gadefelt, Bengt G.; and Bergsten, Lars E., 4,672,926, Cl. 123-90.340.

Berke, Howard R. Solid state NMR probe. 4,672,972, Cl. 128-653.000.

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Berry, Johnny D., to Integral Corporation. Aqueous hydrogel lubricant. 4,673,516, Cl. 252-49.500.

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Bessler, Roger F.: *See*—
Carlson, Curtis R.; Arbeiter, James H.; and Bessler, Roger F., 4,674,125, Cl. 382-49.000.

Beth, Dieter: *See*—
Babsch, Alfred; Beth, Dieter; Panzer, Werner; and Stempfle, Johann, 4,673,810, Cl. 250-231.0SE.
Betts, Robert E.; and Arszman, Jerrold H., to United States of America, Army. Recoilless rocket launcher. 4,672,881, Cl. 89-1.816.
Betts, Robert E., to United States of America, Army. Impactor cap. 4,672,897, Cl. 102-513.000.
Betts, William S., Jr.; Pickering, J. Larry; and Black, William E., to United States of America, Energy. Thermal barrier and support for nuclear reactor fuel core. 4,673,548, Cl. 376-362.000.
Betz Laboratories, Inc.: *See*—
Roling, Paul V., 4,673,489, Cl. 208-289.000.
Bhattacharyya, Bhupati R.: *See*—
Richardson, Paul F.; and Bhattacharyya, Bhupati R., 4,673,511, Cl. 210-734.000.
Biagini, Livio, to B-Art S.a.s. Lubrication system with oil recovery for a two-stroke engine piston with pump-sump for scavenging. 4,672,931, Cl. 123-193.00P.
Bianco, Carlo; Colleluori, Roberto; and De Sanctis, Egidio, to Fameccanica S.p.A. Apparatus for the dry defibration of sheets of fibrous cellulose material and like materials. 4,673,136, Cl. 241-280.000.
Bickley, Robert H.; and Culver, Robin D., to Motorola, Inc. Adaptively stabilized RF amplifier. 4,673,886, Cl. 330-298.000.
Bielomatik Leuze GmbH & Co.: *See*—
Buck, Hermann; and Sommer, Werner, 4,673,382, Cl. 493-359.000.
Bigelow, Louis K.; Grappendorf, Richard H.; and Meskin, Alexander R., to Eastman Christensen Co. Earth boring bit for soft to hard formations. 4,673,044, Cl. 175-329.000.
Bijur Lubricating Corp.: *See*—
Gabriel, Paul K.; Potvin, David E.; and Potvin, James R., 4,674,030, Cl. 364-184.000.
Bilak, Vasil, to General Motors Corporation. Plug. 4,672,993, Cl. 137-322.000.
Billups, James O., Jr.: *See*—
Rothenberg, Barry E.; and Billups, James O., Jr., 4,673,651, Cl. 435-301.000.
Bilt, Michael M. Motor-operated sliding door assembly. 4,672,773, Cl. 49-358.000.
Binder, William T. Vertically adjustable boat furniture. 4,673,155, Cl. 248-404.000.
Binsack, Rudolf: *See*—
Nielinger, Werner; Brinkmeyer, Hermann; Binsack, Rudolf; Bottenbruch, Ludwig; and Fullmann, Heinz-Josef, 4,673,728, Cl. 528-339.000.
Bio-Electric, Inc.: *See*—
Welch, Albert B., 4,672,951, Cl. 128-1.500.
Bioresearch SpA: *See*—
Gennari, Federico, 4,673,534, Cl. 260-501.120.
Biotec: *See*—
Roberfroid, Marcel B.; Viehe, Heinz G.; and Hervens, Francoise M., 4,673,690, Cl. 514-563.000.
Biotechnica International, Inc.: *See*—
Backman, Keith C., 4,673,640, Cl. 435-68.000.
Black, William E.: *See*—
Betts, William S., Jr.; Pickering, J. Larry; and Black, William E., 4,673,548, Cl. 376-362.000.
Blamire, Michael F.; Briscoe, Peter F.; McLeod, Douglas D.; Doolittle, B. Kingsley; and Roach, Michael J., to Murata Erie North America, Ltd. Discoid capacitor structure. 4,673,900, Cl. 333-167.000.
Blanz, Roland, to Graubremse GmbH. Leveling valve with height limit. 4,673,172, Cl. 267-64.110.
Blessing, Gerald V.; and Flynn, Daniel R., to United States of America, Commerce. Acoustic evaluation of thermal insulation. 4,672,851, Cl. 73-597.000.
Blumberg, Baruch S.: *See*—
Venkateswaran, Pinayur S.; Millman, Irving; and Blumberg, Baruch S., 4,673,575, Cl. 424-195.100.
Board of Regents, The University of Texas System: *See*—
Kondraske, George V.; and Shennib, Adnan, 4,674,112, Cl. 379-96.000.
Bock, Jan: *See*—
Siano, Donald B.; and Bock, Jan, 4,673,716, Cl. 525-367.000.
Bock, Jurgen: *See*—
Munning, Hans; Bock, Jurgen; Oldach, Bernd; Ladic, Josef; Rauert, Max-Otto; Emde, Hugo; Petzsch, Dietrich; and de Baan, Johannes J., 4,673,067, Cl. 188-299.000.
Boden, Richard M.; and Helm, John R., to International Flavors & Fragrances Inc. Oxobicyclononane derivatives, process for producing same and organoleptic uses thereof. 4,673,533, Cl. 252-522.00R.
Bodine, Albert G. Method for sonically loosening oil well liner environments. 4,673,037, Cl. 166-249.000.
Boehm, Heinrich: *See*—
Rieber, Norbert; Boehm, Heinrich; Pommer, Ernst-Heinrich; and Dressel, Juergen, 4,673,429, Cl. 71-27.000.
Boeing, Anthony J.: *See*—
Buck, Keith T.; Boeing, Anthony J.; and Dolfini, Joseph E., 4,673,766, Cl. 568-433.000.
Boeing Company, The: *See*—
Burke, James H., 4,673,450, Cl. 156-153.000.
Spencer, Donald B., 4,673,935, Cl. 342-27.000.
Bohler, Erwin, to Werkzeugmaschinenfabrik Oerlikon-Burhle. Firing apparatus for an externally powered firing weapon. 4,672,880, Cl. 89-12.000.
Bohnen, Peter; Prietzel, Gunter; and Kugler, Reinhard, to Siemens Aktiengesellschaft. Low-voltage circuit breaker including a current transformer. 4,673,779, Cl. 200-146.00R.
Boillat, Pierre, to Sodeco-Saia AG. Restraining the instability of a stepper motor. 4,673,855, Cl. 318-696.000.
Boles, David M., to Owens-Corning Fiberglas Corporation. Method and apparatus for facilitating the withdrawal of strand from wound packages. 4,673,140, Cl. 242-54.00R.
Bolt Beranek and Newman Inc.: *See*—
Horrall, Thomas R.; and Greiner, Richard A., 4,674,124, Cl. 381-73.100.
Bonello, Philippe, to Sarcem S.A. Mechanical counter having a digital display. 4,674,106, Cl. 377-82.000.
Bonerb, Timothy C., to Bonerb, Vincent C. Material handling bins with inflatable liners. 4,673,112, Cl. 222-386.500.
Bonerb, Vincent C.: *See*—
Bonerb, Timothy C., 4,673,112, Cl. 222-386.500.
Bontoux, Daniel: *See*—
Schwob, Pierre; and Bontoux, Daniel, 4,673,909, Cl. 337-407.000.
Boots, Robert T., to Vermeulen-Hollandia Octrooien II B.V. Open roof construction for a vehicle. 4,673,210, Cl. 296-221.000.
Borduz, Lucian: *See*—
Gowda, Hanumaiah L.; Raj, Kuldip; and Borduz, Lucian, 4,673,997, Cl. 360-107.000.
Borel, Richard A.: *See*—
Spencer, John E.; Borel, Richard A.; Linxwiler, Kenneth E.; and Hoff, Andrew M., 4,673,456, Cl. 156-345.000.
Bors, Hans; Egger, Peter; Gotz, Albert; and Schwemmer, Martin, to Tristex International AG. Process for applying controlled amounts of liquids to a receptive material web. 4,672,705, Cl. 8-151.000.
Bos, Frans, to AB Volvo. Door hinge for motor vehicles or the like. 4,672,714, Cl. 16-262.000.
Boscoe, John J.; and Gill, Peter L., to Checkpoint Systems, Inc. Article surveillance using reactivatable resonant tags. 4,673,923, Cl. 340-572.000.
Boston University, Trustees of: *See*—
Catsimpoolas, Nicholas, 4,673,667, Cl. 514-25.000.
Bott, John A. Vehicle luggage carrier. 4,673,119, Cl. 224-326.000.
Bottenbruch, Ludwig: *See*—
Nielinger, Werner; Brinkmeyer, Hermann; Binsack, Rudolf; Bottenbruch, Ludwig; and Fullmann, Heinz-Josef, 4,673,728, Cl. 528-339.000.
Bouchu, Michel, to Commissariat a l'Energie Atomique. Device for controlling the priming of a pyrotechnic device. 4,672,895, Cl. 102-206.000.
Bove, Victor M., Jr.: *See*—
Lippman, Andrew B.; Bove, Victor M., Jr.; and Wiesner, Jerome B., 4,673,981, Cl. 358-160.000.
Bovenkerk, Harold P.: *See*—
Lavens, Thomas R.; Corrigan, Francis R.; Shott, Richard L.; and Bovenkerk, Harold P., 4,673,414, Cl. 51-293.000.
Bowen, Robert L. Pivoted track and slot car amusement device or game. 4,673,182, Cl. 273-110.000.
Bowles Fluidics Corporation: *See*—
Stouffer, Ronald D., 4,672,886, Cl. 98-2.090.
Boyce, Steven T.; and Ham, Richard G., to University Patents, Inc. Process and defined medium for growth of human epidermal keratinocyte cells. 4,673,649, Cl. 435-240.000.
Boyd, Clarence J. Portable shelter. 4,672,779, Cl. 52-79.400.
Boyd, James B.; and Abell, Kathleen A. Automotive seat belt assembly for encouraging passenger use. 4,673,195, Cl. 280-801.000.
Bozek, John W. Archery bow with draw force multiplying attachments. 4,672,943, Cl. 124-23.00R.
BP Chemicals Limited: *See*—
Bailly, Jean C., 4,673,662, Cl. 502-115.000.
Braden, Rudolf: *See*—
Fiedler, Paul; Braden, Rudolf; and Buding, Hartmuth, 4,673,757, Cl. 558-431.000.
Braden William I., to Damon Biotech, Inc. Protein harvesting system. 4,673,650, Cl. 435-286.000.
Bradford-White Corporation: *See*—
Staats, Charles W., 4,672,919, Cl. 122-13.00R.
Bradley, Irving; and Hanson, James M., to General Electric Company. Plastic PAR lamp construction. 4,674,017, Cl. 362-349.000.
Brady, Michael B. C.; and Crook, Archie W., to English Electric Valve Company, Limited. Microwave transmitting and receiving arrangements. 4,673,896, Cl. 333-13.000.
Brandenstein, Manfred; Haas, Roland; and Hans, Rudiger, to SKF Kugellagerfabriken GmbH. Supporting member. 4,673,301, Cl. 384-428.000.
Brandt, Inc.: *See*—
Larkin, Francis; and Amey, Jeffrey, 4,674,060, Cl. 364-567.000.
Brandt, Lloyd W. Device for cleaning paint rollers. 4,672,987, Cl. 134-138.000.
Brandt, Maurice W.: *See*—
Swiatlowski, George J.; Trapp, Donald P.; Liescheidt, Duane B.; McDaniel, Arden G.; and Brandt, Maurice W., 4,673,078, Cl. 198-450.000.
Braverman, Milton; and Zink, Leonard, to Braverman, Milton. Moisture impervious means for unit dose packaging. 4,673,086, Cl. 206-538.000.
Brelsford, David P.; Cerutti, Daniel D.; Coleman, Leslie S.; Davison, Gerald A.; Dewey, Pamela H.; Enichen, Margaret C.; Hartley, Sarah T.; Malinowski, Paul A.; Rogers, Roger W.; Tallman, Peter H.; and Czak, Lynn A., to International Business Machines Corporation. Recovery of guest virtual machines after failure of a host real machine. 4,674,038, Cl. 364-200.000.

Brennan, William J., Jr.; and Cottle, Charles A., to Neptune Water Meter Company. Frequency responsive apparatus for reading a meter over a telephone line. 4,674,113, Cl. 379-107.000.

Bresner, David: *See*—
Davison, Alan; Brenner, David; Lister-James, John; and Jones, Alun G., 4,673,562, Cl. 424-1.100.

Bricmont & Associates, Inc.: *See*—
Bricmont, Francis H., 4,673,431, Cl. 75-25.000.

Bricmont, Francis H., to Bricmont & Associates, Inc. Furnace dust recovery process. 4,673,431, Cl. 75-25.000.

Bricot, Claude: *See*—
Gerard, Jean L.; and Bricot, Claude, 4,674,081, Cl. 369-275.000.

Bridges, Donald W.: *See*—
Barajas, Felix; and Bridges, Donald W., 4,673,532, Cl. 252-512.000.

Brigham, Alan: *See*—
Leary, David F.; and Brigham, Alan, 4,673,801, Cl. 219-544.000.

Bringmann, Udo; Drews, Klaus; and Schon, Detlef G., to U.S. Philips Corporation. Device for coating a substrate by means of plasma-CVD or cathode sputtering. 4,673,588, Cl. 427-41.000.

Brinkmeyer, Hermann: *See*—
Nielinger, Werner; Brinkmeyer, Hermann; Binsack, Rudolf; Bottenbruch, Ludwig; and Fullmann, Heinz-Josef, 4,673,728, Cl. 528-339.000.

Briscoe, Peter F.: *See*—
Blamire, Michael F.; Briscoe, Peter F.; McLeod, Douglas D.; Doolittle, B. Kingsley; and Roach, Michael J., 4,673,900, Cl. 333-167.000.

Bristow, Duncan J.; Achia, Biddanda U.; and Evers, Lawrence J., to Exxon Research and Engineering Company. Process for increasing deasphalted oil production from upgraded residua. 4,673,485, Cl. 208-86.000.

Bristow, Ian T., to Hobourn-Eaton Limited. Variable capacity roller- and vane-type pumps with non-circular cam profile. 4,673,341, Cl. 418-26.000.

British Columbia Telephone Company: *See*—
Green, Michael J.; and McKay, James B., 4,674,087, Cl. 370-100.000.

British Gas Corporation: *See*—
Webb, Stephen F.; and Merrick, Brian J., 4,673,449, Cl. 156-94.000.

British Petroleum Company, p.l.c., The: *See*—
Feast, William J.; and Winter, Jeremy N., 4,673,731, Cl. 528-503.000.

British Telecommunications plc: *See*—
Docherty, Brian; and Lambley, Stephen, 4,672,759, Cl. 40-450.000.

British Telecommunications public limited company: *See*—
Miller, Christopher G., 4,674,033, Cl. 364-200.000.

Bromley, Charles W. A.; and Graystone, Jonathan A., to Imperial Chemical Industries PLC. Coating compositions. 4,673,703, Cl. 524-504.000.

Bronander, Wilhelm B., III: *See*—
Alexander, James; and Bronander, Wilhelm B., III, 4,672,795, Cl. 53-446.000.

Brother Kogyo Kabushiki Kaisha: *See*—
Ogaki, Hirokazu; Funahashi, Yasuhiro; Koie, Hiroshi; and Kurachi, Tomoko, 4,674,055, Cl. 364-479.000.

Brothers, Charles E.; and Kim, Chong Y., to Miles Laboratories, Inc. Process to solubilize enzymes and an enzyme liquid product produced thereby. 4,673,647, Cl. 435-189.000.

Brotzmann, Karl; and Mantey, Paul-Gerhard, to Kloeckner CRA Technologie GmbH. Method for installing a converter bottom. 4,673,167, Cl. 266-281.000.

Brown Boveri Reaktor GmbH: *See*—
Vermaat, Huibrecht P., 4,673,027, Cl. 165-11.200.

Brown, Craig J., to Eco-Tec Limited. Fluid treatment process and apparatus. 4,673,507, Cl. 210-681.000.

Brown, Douglas S.: *See*—
Smith, Gaylord D.; Brown, Douglas S.; Bernstein, Philip; and Weller, John E., 4,673,754, Cl. 556-137.000.

Brown, Edward M.: *See*—
Towns, Edward J.; Brown, Edward M.; and Lester, William M., 4,673,096, Cl. 215-230.000.

Brown, Ian G., to Xerox Corporation. Duplex copier. 4,673,279, Cl. 355-3.0SH.

Brown, John D.; Gladdish, Peter; and McCormick, Michael A., to Rolls-Royce Limited. Digital noise generator. 4,673,871, Cl. 324-76.00R.

Brown, Paul A. Record album display and support system. 4,673,152, Cl. 248-216.100.

Bruggemann, Reinhold: *See*—
Grundken, Dieter; and Bruggemann, Reinhold, 4,673,079, Cl. 198-599.000.

Brunner, Gerhard: *See*—
Zerle, Ludwig; Brunner, Gerhard; and Lorenz, Otto, 4,673,803, Cl. 235-436.000.

Brunnett, Carl J.: *See*—
Kerber, Michael M.; and Brunnett, Carl J., 4,674,045, Cl. 364-414.000.

Brunson, Welton K.: *See*—
Hubbard, Vance M.; and Brunson, Welton K., 4,673,084, Cl. 206-438.000.

BSD Medical Corporation: *See*—
Turner, Paul F., 4,672,980, Cl. 128-804.000.

BTR PLC: *See*—
Hawkins, James M., 4,673,366, Cl. 441-90.000.

BTU Engineering Corporation: *See*—
Landis, Donald; and Fabricius, John H., 4,672,997, Cl. 137-554.000.

Bubb, Howard G.: *See*—
Flanagin, Stephen D.; Bubb, Howard G.; and Scantlin, John R., 4,674,082, Cl. 370-60.000.

Buchler B-Set A.G.: *See*—
Buchler, Rene , 4,673,788, Cl. 219-69.00W.

Buchler, Rene , to Buchler B-Set A.G. Straightening device for the wire of a wire electroerosion machine. 4,673,788, Cl. 219-69.00W.

Buck, Hermann; and Sommer, Werner, to Bielomatik Leuze GmbH & Co. Apparatus for forming folded stacks from a web. 4,673,382, Cl. 493-359.000.

Buck, Keith T.; Boeing, Anthony J.; and Dolfini, Joseph E., to Mallinckrodt, Inc. Method of producing benzaldehyde. 4,673,766, Cl. 568-433.000.

Buckler, Robert T.; and Ward, Frederick E., to Miles Laboratories, Inc. Alpha-functionalized derivatives and labeled conjugates of procainamide and NAPA. 4,673,763, Cl. 564-155.000.

Budapesti Muszaki Egyetem: *See*—
Pungor, Erno; Toth, Klara S.; Feher, Zsofia; Nagy, Geza; and Horvai, Gyorgy, 4,673,295, Cl. 356-440.000.

Buding, Hartmuth: *See*—
Fiedler, Paul; Braden, Rudolf; and Buding, Hartmuth, 4,673,757, Cl. 558-431.000.

Buford, J. Philip. Magnetic system for nuclear magnetic resonance diagnostic device. 4,673,882, Cl. 324-320.000.

Bujalski, Joseph; and Welk, John R., to Motorola, Inc. Improved memory control for a scanning CRT visual display system. 4,673,930, Cl. 340-703.000.

Bullock, Donald F.; and Wilson, Austin F., to General Electric Company. Identical left-right current stators for polyphase watthour meter. 4,673,873, Cl. 324-137.000.

Bullock, Thomas W., Jr. Protective coatings and method for protecting tank car containers. 4,673,102, Cl. 220-457.000.

Buma, Shuuichi, to Toyota Jidosha Kabushiki Kaisha. Air suspension. 4,673,171, Cl. 267-8.00R.

Bunyan, Glen W.: *See*—
Phillips, Ian R.; Lodge, Robert H.; and Bunyan, Glen W., 4,673,387, Cl. 604-62.000.

Burba, Christian; Goeke, Ulrich; and Esper, Norbert, to Schering AG. Polyvinyl chloride plastisols. 4,673,710, Cl. 525-111.500.

Burgoyne, Robert A.: *See*—
May, Robert H.; and Burgoyne, Robert A., 4,672,959, Cl. 128-136.000.

Burke, James H., to Boeing Company, The. Method of welding together graphite fiber reinforced thermoplastic laminates. 4,673,450, Cl. 156-153.000.

Burke, Raymond W.; Tiedke, Herman W. B.; and Barton, Brian C., to Thomas Equipment Ltd. Safety brake system. 4,673,054, Cl. 180-271.000.

Burlington Industries, Inc.: *See*—
Myers, Nancy E.; Gamblin, Rodger L.; and Sugg, David J., 4,673,468, Cl. 204-24.000.

Burns, Robert V., to GTE Communication Systems Corporation. Subscriber line circuit having an improved offhook supervision circuit. 4,674,117, Cl. 379-377.000.

Burr-Brown Corporation: *See*—
Hickox, Robert E., 4,672,853, Cl. 73-708.000.

Burroughs Corporation: *See*—
Hsieh, Der C.; and LaBudde, Edward V., 4,674,076, Cl. 369-32.000.
Reis, Mario J. J. M. P. D.; and Couper, John, 4,673,100, Cl. 220-324.000.
Smith, Grant M.; Romania, Samuel R.; and Gibbs, Ronald T., 4,674,004, Cl. 361-384.000.

Bursch, Annegrete: *See*—
Crass, Guenther; Bursch, Annegrete; and Hammerschmidt, Peter, 4,673,611, Cl. 428-215.000.

Buschmann, Ernst; Schuster, Ludwig; Goetz, Norbert; Pommer, Ernst-Heinrich; and Ammermann, Eberhard, to BASF Aktiengesellschaft. Fungicidal piperidine derivatives. 4,673,683, Cl. 514-317.000.

Bush, Vincent N., to Playtronics Corporation. Toy bank with novel coin discriminating mechanism. 4,673,368, Cl. 446-8.000.

Bushey, Dennis J.: *See*—
Bushey, Richard D.; and Bushey, Dennis J., 4,673,213, Cl. 297-284.000.

Bushey, Richard D.; and Bushey, Dennis J. Posture alignment seat shell. 4,673,213, Cl. 297-284.000.

Butcher, Charles: *See*—
Ramspacher, Robert J.; and Butcher, Charles, 4,672,732, Cl. 29-429.000.

Byfield, Dwight, Jr. Side mount universal battery terminal. 4,673,240, Cl. 439-755.000.

Byford, Trevor K., to General Motors Corporation. Seat belt retractor. 4,673,144, Cl. 242-107.40C.

C-I-L Inc.: *See*—
Masse, Gary M. J.; and Edmonds, Anthony C. F., 4,673,560, Cl. 423-532.000.

C. Otto & Comp. G.m.b.H.: *See*—
Kwasuik, Hans-Jurgen; and Piduch, Hans-Gunter, 4,673,463, Cl. 201-41.000.

Cabot, Louis: *See*—
LeBlond, Henri; and Cabot, Louis, 4,672,846, Cl. 73-180.000.

Caldwell Manufacturing Company: *See*—
Newton, William P.; and Flight, Robert S., 4,672,713, Cl. 16-197.000.

California Institute of Technology: *See*—
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Sugimori, Shigeru; Ogawa, Tetsuya; Goto, Yasuyuki; Isoyama, Toyoshiro; Nigorikawa, Kazunori; Kitano, Kisei; Yoshida, Naoyuki; and Furukawa, Yoshito, 4,673,529, Cl. 252-299.630.
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Contri, Robert F.; and Hemrich, William R., to John Zink Company. Dual temperature electric curling iron having a safety shut-off circuit. 4,673,798, Cl. 219-225.000.
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Heinze, Walter O.; and Tufts, Wesley M., 4,672,689, Cl. 4-415.000.
Cook, Douglas C. Adjustable strap. 4,672,910, Cl. 114-361.000.
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Cory, Charles E. Fruit shredding apparatus. 4,673,135, Cl. 241-82.100.
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Couper, John: *See*—
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Cox, David, to Gasohol Energy Pty. Ltd. Process for the manufacture of hydrated oxides and tri- and tetra- basic lead sulphates. 4,673,561, Cl. 423-559.000.
Craig, Clark E., to Keycon Hardware Products, Inc. Disc tumbler lock with removable plug. 4,672,827, Cl. 70-367.000.
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Crass, Guenther; Bursch, Annegrete; and Hammerschmidt, Peter, to Hoechst Aktiengesellschaft. Support film and pressure-sensitive adhesive tape. 4,673,611, Cl. 428-215.000.
Craver, Richard D., to Orrville Products, Inc. Secondary combustion device for woodburning stove. 4,672,946, Cl. 126-77.000.
Creative Products Resource Associates, Ltd.: *See*—
Smith, James A.; and Kellett, George W., 4,673,523, Cl. 252-91.000.
Croce, Frank D. Air conditioning cooling device. 4,672,817, Cl. 62-183.000.
Crombie, Terence G.; and Wong, Bernard K., to Insul-Rib, Inc. Inflatable greenhouse vent cover. 4,672,888, Cl. 98-29.000.
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Brady, Michael B. C.; and Crook, Archie W., 4,673,896, Cl. 333-13.000.
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Cruz-Uribe, Antonio S.: *See*—
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Crystal, Richard G., to Xerox Corporation. Printwheel for use in a serial printer. 4,673,305, Cl. 400-460.000.
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Culler, Scott R., to Minnesota Mining and Manufacturing Company. Stable silanol priming solution for use in dentistry. 4,673,354, Cl. 433-217.100.
Cullick, Alvin S., to Mobil Oil Corporation. Method and system for determining fluid volumes of a two-phase effluent fluid flow through a porous material. 4,672,840, Cl. 73-38.000.
Culver, Robin D.: *See*—
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Cunningham, Howard G., Jr., to Tektronix, Inc. Waveform data display. 4,673,931, Cl. 340-722.000.
Cunningham, Jerry M. Safety device for preventing the unauthorized firing of a weapon by releasing the hammer spring. 4,672,763, Cl. 42-70.110.
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Curran, Barry D., to Morgan Corporation. Scale devices. 4,673,048, Cl. 177-146.000.
Curro, John G.: *See*—
Aubert, James H.; Clough, Roger L.; Curro, John G.; Quintana, Carlos A.; Russick, Edward M.; and Shaw, Montgomery T., 4,673,695, Cl. 521-64.000.
Curry, Raymond L. Mini-kitchen. 4,672,944, Cl. 126-25.00R.
Curry, Roger F. N. Flat bed knitting machines. 4,672,824, Cl. 66-146.000.
Curtin, William J.; Adams, Cedric; and Soto, Stephen H., to Amtelco. Telephone line concentrator without switching matrix. 4,674,116, Cl. 379-211.000.
Cuzin, Daniel, to ATOCHEM. Polyamide oligomer-epoxy polymers and methods for their preparation and use. 4,673,723, Cl. 528-113.000.
Cymatics, Inc.: *See*—
Siczek, Roman W.; Stanley, William W.; and Mikyska, Glenn E., 4,673,297, Cl. 366-208.000.
Czak, Lynn A.: *See*—
Brelsford, David P.; Cerutti, Daniel D.; Coleman, Leslie S.; Davison, Gerald A.; Dewey, Pamela H.; Enichen, Margaret C.; Hartley, Sarah T.; Malinowski, Paul A.; Rogers, Roger W.; Tallman, Peter H.; and Czak, Lynn A., 4,674,038, Cl. 364-200.000.
Dadpey, Habib: *See*—
Shero, David J.; Dadpey, Habib; and Magee, C. Scott, 4,673,859, Cl. 318-810.000.
Dai Nippon Insatso Kabushiki Kaisha: *See*—
Kobayashi, Yuji; and Takahashi, Norio, 4,673,807, Cl. 250-214.0AG.
Dai Nippon Insatsu Kabushiki Kaisha: *See*—
Takeda, Mitsuru; and Kuramochi, Wataru, 4,673,626, Cl. 430-14.000.
D'Aiello, Frank J., Jr., to Ohio Grain Company, The. Method of producing veal and animal feed therefor. 4,673,576, Cl. 426-2.000.
Daikin Industries Ltd.: *See*—
Fukui, Shosin; Shinjo, Masayoshi; Aoyama, Hirokazu; Okazaki, Yasuko; Enjo, Naonori; and Hayashi, Kazunori, 4,673,712, Cl. 526-253.000.
Daikin Kogyo Co., Ltd.: *See*—
Enjo, Naonori; Noguchi, Masahiro; and Ide, Satoshi, 4,673,517, Cl. 252-67.000.
Harada, Tokuya; and Higashiura, Tadashi, 4,673,644, Cl. 435-101.000.
Dainippon Ink and Chemicals, Inc.: *See*—
Sasaki, Makoto; Sasaki, Haruyoshi; and Sato, Hisato, 4,673,756, Cl. 558-416.000.
Dainippon Screen Mfg. Co., Ltd.: *See*—
Ikuta, Kunio; and Yamada, Katsunori, 4,673,971, Cl. 358-75.000.
Yamada, Mitsuhiko; and Kitamura, Hideaki, 4,673,989, Cl. 358-287.000.
Yoshimi, Yasuhito, 4,673,273, Cl. 354-322.000.
Daiwa Fine Chemicals Co., Ltd.: *See*—
Obata, Keigo; Dohi, Nobuyasu; Okuhama, Yoshiaki; Masaki, Seishi; Okada, Yukiyoshi; and Yoshimoto, Masakazu, 4,673,470, Cl. 204-44.400.
Dakin, John P., to Plessey Overseas Limited. Temperature measuring arrangements using optical fibre sensor. 4,673,299, Cl. 374-131.000.
Dalcanale, Enrico, to Montedison S.p.A. Process for the preparation of 2-alkyl cyclopent-2-enones. 4,673,759, Cl. 560-122.000.
Dalebout, Melvin W.: *See*—
Sias, Ralph M.; Hurley, Nancy J.; and Dalebout, Melvin W., 4,673,605, Cl. 428-120.000.
Dallaire, Serge; and Champagne, Blaise. TiB_2-based materials and process of producing the same. 4,673,550, Cl. 419-12.000.
Damiani, Fernando, to COMAU S.p.A. Automatic apparatus for induction hardening. 4,673,785, Cl. 219-10.570.
Damman, Cornelis C.; and Plaatsman, Jacob, to Holland Mechanics B.V. Method and apparatus for laying a pneumatic tire around a wheel rim. 4,673,016, Cl. 157-1.240.
Damon Biotech, Inc.: *See*—
Braden William I., 4,673,650, Cl. 435-286.000.
Dang, Hiep D.: *See*—
Morris, Gregory J. E.; Grosshandler, Sandor; Beaver, Richard N.; Pimlott, John R.; and Dang, Hiep D., 4,673,479, Cl. 204-279.000.
Daniels, Erwin: *See*—
Schneider, Horst; Schmidt, Wilhelm; and Daniels, Erwin, 4,673,249, Cl. 350-287.000.
Danno, Sadaji: *See*—
Matsuda, Osamu; and Danno, Sadaji, 4,673,580, Cl. 426-385.000.
Danto, Joseph. Brain stimulation of balance response. 4,672,978, Cl. 128-782.000.
Darling, Richard S.; Goodrich, Stanley R., Jr.; and Holzhausen, Alan D., to General Motors Corporation. Power steering gear with two-way check valve. 4,673,051, Cl. 180-132.000.
Dataproducts Corporation: *See*—
Rubinstein, Stanley; and Baker, Stephen B., 4,673,306, Cl. 400-618.000.
Datta, Rabinder S.; Aplan, Frank F.; and Zebula, Charles, to Chevron Research Company. Process for beneficiating oil shale using froth flotation and selective flocculation. 4,673,133, Cl. 241-19.000.
Daugherty, Ronald R.: *See*—
Habig, Peter C.; and Daugherty, Ronald R., 4,673,081, Cl. 206-223.000.
David, Constant V. External combustion slidable vane motor with air cushions. 4,672,813, Cl. 60-595.000.
Davidson, Henry A. Multi-location adjustable table. 4,672,898, Cl. 108-6.000.
Davies, David H. Retrolasing catheter and method. 4,672,961, Cl. 128-303.100.
Davis, Brian: *See*—
Le-Carpentier, Alex; and Davis, Brian, 4,672,758, Cl. 40-152.100.
Davis, John W. Automotive collision avoidance and/or air bag deployment radar. 4,673,937, Cl. 342-72.000.
Davis, Keith P.; and Talbot, Robert E., to Albright & Wilson Limited. Biocidal water treatment. 4,673,509, Cl. 210-699.000.
Davis, William F., to Motorola, Inc. Current mirror circuit and method for providing zero temperature coefficient trimmable current ratios. 4,673,867, Cl. 323-315.000.
Davison, Alan; Brenner, David; Lister-James, John; and Jones, Alun G., to Children's Medical Center Corporation, The; and Massachusetts Institute of Technology. Bisamide bisthiol compounds useful for making technetium radiodiagnostic renal agents. 4,673,562, Cl. 424-1.100.
Davison, Gerald A.: *See*—
Brelsford, David P.; Cerutti, Daniel D.; Coleman, Leslie S.; Davison, Gerald A.; Dewey, Pamela H.; Enichen, Margaret C.; Hartley, Sarah T.; Malinowski, Paul A.; Rogers, Roger W.; Tallman, Peter H.; and Czak, Lynn A., 4,674,038, Cl. 364-200.000.
Dayus, Lloyd G., to Rachels Industries, Inc. Lightweight load bearing register. 4,672,890, Cl. 98-114.000.
Dean, Arthur L.; Kraft, Robert E.; and Marshall, Kenneth M., to FMC Corporation. Electromagnetic vibratory exciter. 4,673,833, Cl. 310-29.000.
Dean, Ralph R. Cleaner composition. 4,673,524, Cl. 252-118.000.

Dearden, Geoffrey C.; Speare, Edward J.; Ueno, Katsuo; and Jones, Donald N., to Husting Oilfield Services (UK) Limited; and Kawasaki Steel Corporation. Pipe connector. 4,673,201, Cl. 285-333.000.

de Baan, Johannes J.: *See*—
Munning, Hans; Bock, Jurgen; Oldach, Bernd; Ladic, Josef; Rauert, Max-Otto; Emde, Hugo; Petzach, Dietrich; and de Baan, Johannes J., 4,673,067, Cl. 188-299.000.

Debiopharm, S.A.: *See*—
Orsolini, Piero; Mauvernay, Rolland-Yves; and Deghenghi, Romano, 4,673,595, Cl. 427-213.320.

De Boer, Gerben F., to Centraal Diergeneeskundig Instituut. Live purified Marek's disease vaccine. 4,673,572, Cl. 424-89.000.

De Bruijn, Alexis M. R., to Koni B. V. Hydraulic twin-pipe shock absorber. 4,673,068, Cl. 188-315.000.

Decheim, Robert: *See*—
Lamson, Frederick W.; Lansing, Richard; Decheim, Robert; and Martin, William, 4,673,092, Cl. 211-188.000.

Deck, Charles F.: *See*—
Owens, James P.; and Deck, Charles F., 4,673,518, Cl. 252-75.000.

Decock, Bernard: *See*—
Rosseel, Rik; Decock, Bernard; Wyffels, Marc; and Ampe, Frank, 4,673,004, Cl. 139-435.000.

Dee, Robert N.; and Reich, Charles. Scalpel with universally adjustable blade. 4,672,964, Cl. 128-305.000.

De Garie, Claude; Cocci, Albert; and Landine, Robert C., to Adi Limited. Bulk volume fermenter. 4,572,691, Cl. 4-499.000.

Deghenghi, Romano: *See*—
Orsolini, Piero; Mauvernay, Rolland-Yves; and Deghenghi, Romano, 4,673,595, Cl. 427-213.320.

Degussa AG: *See*—
Schwarze, Werner; Wolff, Siegfried; Remmel, Hans; and Lambertz, Horst, 4,673,741, Cl. 544-209.000.

Degussa Aktiengesellschaft: *See*—
Hettche, Helmut; Emig, Peter; and Engel, Jurgen, 4,673,666, Cl. 514-23.000.

Delaware Halliburton Company: *See*—
Minear, John W.; and McNiece, Raymond J., 4,673,033, Cl. 166-55.100.

Delbecq, Gerard; Markey, Jean-Pierre; Marcq, Bernard; and Val, Rene , to Usinor Aciers. Machine for removing burrs from slabs. 4,672,726, Cl. 29-33.00A.

DeLuca, Michael J.; and Mittel, James G., to Motorola, Inc. Charge coupled LED driver circuit. 4,673,865, Cl. 323-222.000.

de Man, Heiko T. Beverage dispensing gun. 4,673,108, Cl. 222-144.500.

Dempsey, Edward J. Portable game fish attracting device. 4,672,764, Cl. 43-4.000.

Denis, Rene ; Ghiringhelli, Giulio; and Schaal, Alfred, to Commissariat a l'Energie Automatique; and Communaute, European de l'Energie Atomique (Euratom). Cabled ultrasonic seal. 4,673,922, Cl. 340-572.000.

DePass, Ernest T.: *See*—
Casey, Francis J.; DePass, Ernest T.; and Gilman, Kevin R., 4,673,514, Cl. 210-783.000.

Dermitzakis, Stefanos: *See*—
Angerstein, Jorg; Wagner, Elmar; and Dermitzakis, Stefanos, 4,674,093, Cl. 372-38.000.

Derouane, Eric G.; and von Ballmoos, Roland, to Mobil Oil Corporation. Silicoaluminophosphate crystallization using hydrolysis. 4,673,559, Cl. 423-306.000.

Derrico, Gerard G., to Dynapert-HTC Corporation. Vapor phase processing system. 4,672,912, Cl. 118-64.000.

De Sanctis, Egidio: *See*—
Bianco, Carlo; Colleluori, Roberto; and De Sanctis, Egidio, 4,673,136, Cl. 241-280.000.

De Simone, Richard E.: *See*—
Nimry, Tayseer S.; and De Simone, Richard E., 4,673,767, Cl. 585-467.000.

DeSoto, Inc.: *See*—
Ansel, Robert E.; and Murray, Kevin P., 4,673,705, Cl. 524-850.000.

Dessens, Petrus A.; and Rumphorst, Reiner F., to U.S. Philips Corporation. Circuit comprising series-connected semiconductor elements. 4,673,864, Cl. 323-221.000.

Deters, Joseph C.: *See*—
Guittard, George V.; Deters, Joseph C.; Theeuwes, Felix; and Cortese, Richard, 4,673,405, Cl. 604-890.000.

Dettling, Hubert: *See*—
Leonhard, Rolf; and Dettling, Hubert, 4,672,808, Cl. 60-286.000.

Deutsche AG fur Unterhaltungselectronic OHG: *See*—
Erxleben, Tomas, 4,673,267, Cl. 352-242.000.

Deutsche Gesellschaft fur Wiederaufarbeitung von Kernbrennstoffen mbH: *See*—
Schroeder, Guenter; Dudek, Guenther; and Schrader, Heinolf, 4,673,814, Cl. 250-506.100.

Deutz-Allis Corporation: *See*—
Huhman, Michael L., 4,672,981, Cl. 130-27.00R.

Development Finance Corporation of New Zealand: *See*—
Scott, Gregory C., 4,672,719, Cl. 24-113.00R.

Devrient, Ludwig: *See*—
Maurer, Thomas; and Devrient, Ludwig, 4,672,891, Cl. 101-32.000.

Dew, Douglas, to Sonomo Corporation. Laser healing method. 4,672,969, Cl. 128-397.000.

Dewey, Pamela H.: *See*—
Brelsford, David P.; Cerutti, Daniel D.; Coleman, Leslie S.; Davison, Gerald A.; Dewey, Pamela H.; Enichen, Margaret C.; Hartley, Sarah T.; Malinowski, Paul A.; Rogers, Roger W.; Tallman, Peter H.; and Czak, Lynn A., 4,674,038, Cl. 364-200.000.

Dhein, Rolf: *See*—
Meier, Helmut-Martin; Dhein, Rolf; Winkel, Jens; Klein, Gerhard; and Kloker, Werner, 4,673,713, Cl. 525-278.000.

Diakin Kogyo Co., Ltd.: *See*—
Yamashita, Hiroshi; Fujii, Kanenaga; Hayakawa, Junji; Komiyama, Toru; and Tamaru, Sinji, 4,673,243, Cl. 350-96.150.

Diazzi, Claudio: *See*—
Cini, Carlo; Diazzi, Claudio; and Erratico, Pietro, 4,673,889, Cl. 330-10.000.

Dickey, Rosalie J. Meat tenderizing apparatus. 4,672,716, Cl. 17-26.000.

Dicomed Corporation: *See*—
Lindbloom, Bruce J.; Mathews, Peter; and Yam, David S., 4,674,058, Cl. 364-518.000.

Diesel Kiki Co., Ltd.: *See*—
Kushida, Takeo; and Yamada, Keiichi, 4,673,163, Cl. 251-129.100.
Mino, Kaoru; and Yanagisawa, Yoshikazu, 4,672,819, Cl. 62-298.000.
Takahashi, Tadahiro, 4,672,816, Cl. 62-180.000.

Dietrich, Albert; Katz, Peter; and Vincken, Josef, to Dornier GmbH. Cardan suspension for microphones for sound ranging in water. 4,674,075, Cl. 367-173.000.

Dietrich, Harry B.: *See*—
Thompson, Phillip E.; and Dietrich, Harry B., 4,673,446, Cl. 148-33.000.

DiGiulio, Adolph V.: *See*—
Meyer, Bernard H.; DiGiulio, Adolph V.; Kinslow, Joseph C.; and Hajnik, Dennis M., 4,673,694, Cl. 521-59.000.

Di Luccio, Robert C.; Duggins, Ray B.; and Shefter, Eli, to Du Pont de Nemours, E. I., and Company. Pharmaceutical compositions containing hollow fine tubular drug delivery systems. 4,673,565, Cl. 424-443.000.

DiPietro, Vincent. Magnetic alignment toy. 4,673,369, Cl. 446-133.000.

Director-General of Agency of Industrial Science and Technology: *See*—
Matsumura, Kiichiro; Takahashi, Akio; and Tsukamoto, Jun, 4,673,720, Cl. 526-285.000.
Yamashita, Hiroshi; Fujii, Kanenaga; Hayakawa, Junji; Komiyama, Toru; and Tamaru, Sinji, 4,673,243, Cl. 350-96.150.

Dischert, Robert A.; Topper, Robert J.; and Shyu, William M., to RCA Corporation. Progressive scan processor with plural frequency band interpolation. 4,673,978, Cl. 358-140.000.

Diskowski, Jorg; Jeppel, Wolfgang; Moisel, Hartmut; and Spiess, Hans P., to Hellige GmbH. Method and device for the automatic calibration of measuring and indicating appliances for the determination of partial pressure of a gas. 4,674,061, Cl. 364-571.000.

Disser, Robert J., to General Motors Corporation. PWM motor operating system with RFI suppression. 4,673,851, Cl. 318-341.000.

Ditzig, Albert, to Telephone Products, Inc. Rotary electrical connector apparatus. 4,673,228, Cl. 439-21.000.

Diversified Petroleum Recovery, Inc.: *See*—
Babcock, Robert E.; Beaver, W. Hardey; and Wood, F. Dianne, 4,673,484, Cl. 208-435.000.

DiVito, Enrico E. Oral hygiene apparatus. 4,672,953, Cl. 128-66.000.

Djudjev, Slavtcho G.: *See*—
Todorov, Dimiter T.; Djudjev, Slavtcho G.; and Yarumov, Kiril D., 4,672,854, Cl. 73-861.330.

Doane, Joseph W.: *See*—
West, John; Golemme, Attilio; and Doane, Joseph W., 4,673,255, Cl. 350-347.00V.

Dobashi, Toshihiro: *See*—
Konno, Masanori; Imai, Kiyoshi; and Dobashi, Toshihiro, 4,673,791, Cl. 219-69.00M.

Docherty, Brian; and Lambley, Stephen, to British Telecommunications plc. Alphabetic display. 4,672,759, Cl. 40-450.000.

Dr. Ing. h.c.F. Porsche Aktiengesellschaft: *See*—
Kretschmer, Helmut; and Hochkoenig, Manfred, 4,673,206, Cl. 296-1.00S.

Dohi, Nobuyasu: *See*—
Obata, Keigo; Dohi, Nobuyasu; Okuhama, Yoshiaki; Masaki, Seishi; Okada, Yukiyoshi; and Yoshimoto, Masakazu, 4,673,470, Cl. 204-44.400.

Doi, Haruo: *See*—
Kamigaito, Osami; Noda, Shoji; and Doi, Haruo, 4,673,587, Cl. 427-38.000.

Dolfini, Joseph E.: *See*—
Buck, Keith T.; Boeing, Anthony J.; and Dolfini, Joseph E., 4,673,766, Cl. 568-433.000.

Donnelly Corporation: *See*—
Weirick, Richard A., 4,673,797, Cl. 219-203.000.

Doolittle, B. Kingsley: *See*—
Blamire, Michael F.; Briscoe, Peter F.; McLeod, Douglas D.; Doolittle, B. Kingsley; and Roach, Michael J., 4,673,900, Cl. 333-167.000.

Dornier GmbH: *See*—
Dietrich, Albert; Katz, Peter; and Vincken, Josef, 4,674,075, Cl. 367-173.000.

Doros, Jacek P.: *See*—
Lewandowski, Raymond F.; Doros, Jacek P.; and Redfield, William H., 4,673,778, Cl. 200-67.00B.

Doty, Keith: *See*—
Perciful, David D., 4,673,219, Cl. 299-39.000.

Douglas, Helen E. Garment drying hanger. 4,673,114, Cl. 223-89.000.

Dow Chemical Company, The: *See—*
Bertram, James L.; and Woo, Edmund P., 4,673,764, Cl. 564-155.000.
Bertram, James L.; and Woo, Edmund P., 4,673,765, Cl. 564-155.000.
Morris, Gregory J. E.; Grosshandler, Sandor; Beaver, Richard N.; Pimlott, John R.; and Dang, Hiep D., 4,673,479, Cl. 204-279.000.
Rickle, Gregory K., 4,673,755, Cl. 556-489.000.

Dowa Mining Co., Ltd.: *See—*
Hashimoto, Shoji, 4,673,597, Cl. 427-374.400.

Dressel, Juergen: *See—*
Rieber, Norbert; Boehm, Heinrich; Pommer, Ernst-Heinrich; and Dressel, Juergen, 4,673,429, Cl. 71-27.000.

Drewek, David F., to General Motors Corporation. Vehicle body structure. 4,673,205, Cl. 293-132.000.

Drews, Klaus: *See—*
Bringmann, Udo; Drews, Klaus; and Schon, Detlef G., 4,673,588, Cl. 427-41.000.

Driller, Hubert; and Mang, Paul, to MANIA Electronik Automatisation Entwicklung und Geratebau GmbH. Contact array assembly for a computer-controlled printed circuit board testing apparatus. 4,674,006, Cl. 361-393.000.

Du Pont Canada Inc.: *See—*
Yeates, John N., 4,673,768, Cl. 585-519.000.

Dubey, Thomas W. Method and apparatus for repairing copper pipes. 4,673,122, Cl. 228-119.000.

Dubief, Claude: *See—*
Grollier, Jean F.; Dubief, Claude; and Cauwet, Daniele, 4,673,568, Cl. 424-47.000.

Dubovsky, George; and Garner, Terry N., to General Electric Company. Battery charger/remote control for portable radio devices. 4,673,861, Cl. 320-2.000.

Dudek, Guenther: *See—*
Schroeder, Guenter; Dudek, Guenther; and Schrader, Heinolf, 4,673,814, Cl. 250-506.100.

Dudill, Roger: *See—*
Riley, Eric K.; Dudill, Roger; and Young, Philip J., 4,673,348, Cl. 431-115.000.

Dufresne, Yves: *See—*
Monet, Paul E.; and Dufresne, Yves, 4,674,111, Cl. 379-58.000.

Duggins, Ray B.: *See—*
Di Luccio, Robert C.; Duggins, Ray B.; and Shefter, Eli, 4,673,565, Cl. 424-443.000.

Dunkin, Albert. Knife sharpening device. 4,672,777, Cl. 51-128.000.

Dunn, William W.: *See—*
Hirsch, Michael; Kristensen, Peter D.; and Dunn, William W., 4,672,845, Cl. 73-151.000.

Du Pont de Nemours, E. I., and Company: *See—*
Aungst, Bruce J.; and Hussain, Munir A., 4,673,679, Cl. 514-282.000.
Caywood, Stanley W., Jr., 4,673,715, Cl. 525-340.000.
Di Luccio, Robert C.; Duggins, Ray B.; and Shefter, Eli, 4,673,565, Cl. 424-443.000.
Ryntz, Rose A.; and Kurple, Kenneth R., 4,673,718, Cl. 525-476.000.
Tanaka, Shigeru, 4,673,823, Cl. 307-11.000.

Duprez, Wayne R. Pressure compensated temperature switch unit for protection of an internal combustion engine. 4,672,920, Cl. 123-41.150.

Durame, Claude: *See—*
Badouard, Michel; Durame, Claude; and Pade, Bernard, 4,673,085, Cl. 206-459.000.

Durfee, Norman E., Jr.: *See—*
Rock, John A.; Durfee, Norman E., Jr.; and Johnson, Robert O., 4,673,708, Cl. 525-66.000.

Dusar, Heinz. Moveable lower guide for sliding doors. 4,672,694, Cl. 4-607.000.

Dwight, William H. Exercise machine having variable radius crank arm. 4,673,178, Cl. 272-73.000.

Dykema, Owen W. Constant spring force mechanism. 4,673,170, Cl. 267-174.000.

Dymo Science Inc.: *See—*
Sjogren, Arne B., 4,673,296, Cl. 366-159.000.

Dynamit Nobel AG: *See—*
Schmidt, Hans-Georg, 4,673,760, Cl. 560-124.000.
Steffen, Klaus-Dieter; and Meyer, Gunther, 4,673,751, Cl. 549-294.000.

Dynapert-HTC Corporation: *See—*
Derrico, Gerard G., 4,672,912, Cl. 118-64.000.

E.I. Du Pont de Nemours and Company: *See—*
Jansson, Peter A.; Rogers, Wade T.; and Schwaber, James S., 4,673,988, Cl. 358-280.000.

E.L. LeBaron Foundry Co.: *See—*
LeBaron, Francis, 4,673,310, Cl. 404-26.000.

E. R. Squibb & Sons, Inc.: *See—*
Varma, Ravi K.; Gordon, Eric M.; and Simpkins, Ligaya M., 4,673,685, Cl. 514-333.000.

E-Vac, Inc.: *See—*
Mickler, Paul W., 4,672,711, Cl. 15-306.00A.

Eagleair, Inc.: *See—*
Hagar, Donald K.; Kennedy, Curtis V.; and Townsend, Garnold, 4,673,026, Cl. 165-9.000.

Early, Thad: *See—*
Engelmann, Rudolph H.; and Early, Thad, 4,673,888, Cl. 330-10.000.

Eastman Christensen Co.: *See—*
Bigelow, Louis K.; Grappendorf, Richard H.; and Meskin, Alexander R., 4,673,044, Cl. 175-329.000.

Eastman Kodak Company: *See—*
Jackson, Winston J., Jr.; and Morris, John C., 4,673,726, Cl. 528-288.000.

Eaton Corporation: *See—*
Hoppie, Lyle O.; Chute, Richard; Scharnweber, David H.; and Waichunas, Kenneth P., 4,672,938, Cl. 123-538.000.
Kenway, Sidney, 4,673,780, Cl. 200-302.200.

Eaton, Richard G.; and Keyser, John J. Hand and finger X-ray positioning device. 4,674,110, Cl. 378-208.000.

Eccles, Richard M.: *See—*
Li, Allen S.; Eccles, Richard M.; and Ruef, Lloyd M., 4,673,552, Cl. 422-140.000.

Ecer, Gunes. Method for preparing fully dense, near-net-shaped objects by powder metallurgy. 4,673,549, Cl. 419-10.000.

Eclipse, Inc.: *See—*
Collier, David W., 4,673,350, Cl. 431-353.000.

Eco-Tec Limited: *See—*
Brown, Craig J., 4,673,507, Cl. 210-681.000.

Ecolotech, Inc.: *See—*
Rose, Thomas A., 4,673,819, Cl. 250-573.000.

Ed. Zublin Aktiengesellschaft: *See—*
Nussbaumer, Manfred, 4,673,312, Cl. 405-184.000.
Nussbaumer, Manfred; Glaser, Eberhard; and Beitinger, Eberhard, 4,673,316, Cl. 405-267.000.

Edlin, George R.: *See—*
Strickland, Brian R.; and Edlin, George R., 4,673,870, Cl. 324-74.000.

Edmonds, Anthony C. F.: *See—*
Masse, Gary M. J.; and Edmonds, Anthony C. F., 4,673,560, Cl. 423-532.000.

Edsall, Jesse A.: *See—*
Wilkinson, Herbert C.; and Edsall, Jesse A., 4,672,836, Cl. 72-479.000.

Edwards, Charles W., to Westinghouse Electric Corp. Multi-inverter control apparatus. 4,674,025, Cl. 363-71.000.

Edwards, Charles W.: *See—*
Paice, Derek A.; and Edwards, Charles W., 4,674,024, Cl. 363-71.000.

Egger, Peter: *See—*
Bors, Hans; Egger, Peter; Gotz, Albert; and Schwemmer, Martin, 4,672,705, Cl. 8-151.000.

Eggleston, Ross W.: *See—*
Thomas, Richard A.; and Eggleston, Ross W., 4,673,288, Cl. 356-72.000.

Ehle, Joachim, to Fuchs Systemtechnik GmbH. Electric arc furnace. 4,674,102, Cl. 373-98.000.

Ehrlich, Johann, to Patoflex Corporation. Shoe sole. 4,672,754, Cl. 36-85.000.

Ehrmann-Falkenau, Ekkehard; Veith, Richard; and Till, Wolfgang, to Siemens Aktiengesellschaft. Electrical filter operating with acoustic waves. 4,673,901, Cl. 333-196.000.

Ekchian, Jack A.; Hoffman, Robert W.; Ekchian, Leon; and Gabriel, Kaigham J., to Revlon, Inc. Rapid inventory data acquistion system. 4,673,932, Cl. 340-825.540.

Ekchian, Leon: *See—*
Ekchian, Jack A.; Hoffman, Robert W.; Ekchian, Leon; and Gabriel, Kaigham J., 4,673,932, Cl. 340-825.540.

Electricite de France: *See—*
Nuns, Jacques; and Abraham, Joseph, 4,673,781, Cl. 219-10.49R.

Electro-Voice, Inc.: *See—*
Engelmann, Rudolph H.; and Early, Thad, 4,673,888, Cl. 330-10.000.

Electromagnetic Sciences, Inc.: *See—*
Hoover, John C., 4,673,946, Cl. 343-776.000.

Elettronica San Giorgio - ELSAG S.p.A.: *See—*
Filauro, Paolo; and Musso, Giorgio, 4,673,804, Cl. 235-463.000.

Elevator GmbH: *See—*
Halonen, Heino T. K.; and Pohjonen, Jukka I., 4,673,326, Cl. 414-286.000.
Kononen, Juhani, 4,673,066, Cl. 188-119.000.

Elmore, Carl L.; Sherman, Paul; and McGrath, Daniel A., to Kamyr, Inc. Radial configuration of evaporator heating elements and method. 4,673,459, Cl. 159-13.100.

Emde, Hugo: *See—*
Munning, Hans; Bock, Jurgen; Oldach, Bernd; Ladic, Josef; Rauert, Max-Otto; Emde, Hugo; Petzsch, Dietrich; and de Baan, Johannes J., 4,673,067, Cl. 188-299.000.

Emerson Electric Co.: *See—*
Langowski, Emil J., 4,672,858, Cl. 74-424.80R.
LaRou, Albert M., 4,673,302, Cl. 384-548.000.

Emhart Industries, Inc.: *See—*
Smith, John W.; and Lipp, Ellis P., 4,673,239, Cl. 439-746.000.

Emig, Peter: *See—*
Hettche, Helmut; Emig, Peter; and Engel, Jurgen, 4,673,666, Cl. 514-23.000.

Emond, George T.: *See—*
Ostreicher, Eugene A.; Knight, Rodney A.; Fiore, Joseph V.; Emond, George T.; and Hou, Kenneth C., 4,673,504, Cl. 210-500.220.

Emori, Masashi, to Sony Corporation. Cassette holder in recording and reproducing apparatus for magnetic tape cassette having underside-covering sliding shutter member. 4,673,145, Cl. 242-198.000.

Enami, Kazumasa: *See—*
Murakami, Keinosuke; Enami, Kazumasa; and Yagi, Nobuyuki, 4,673,980, Cl. 358-149.000.

Encon Systems, Ltd.: *See—*
Schmidt, Donald R., 4,672,932, Cl. 123-196.00A.

Endo, Toshihiko: *See—*
Igarashi, Takeshi; Endo, Toshihiko; and Koshi, Isei, 4,673,636, Cl. 435-34.000.

Endoh, Seiji; Kimura, Kunio; Ohta, Toshihiko; and Kato, Yasuo, to Toyo Boseki Kabushiki Kaisha. Polymeric whisker and production of the same. 4,673,724, Cl. 528-206.000.

Energy Conversion Devices, Inc.: *See—*
Ovshinsky, Stanford R.; and Hudgens, Stephen J., 4,673,957, Cl. 357-2.000.

Engel, Joseph C., to Westinghouse Electric Corp. Supervisory circuit for a programmed processing unit. 4,674,035, Cl. 364-200.000.

Engel, Jurgen: *See—*
Hettche, Helmut; Emig, Peter; and Engel, Jurgen, 4,673,666, Cl. 514-23.000.

Engelmann, Rudolph H.; and Early, Thad, to Electro-Voice, Inc. Power control system. 4,673,888, Cl. 330-10.000.

Engetra S.A.: *See—*
Schwickert, Manfred J.; and Lemmens, Pierre L., 4,673,421, Cl. 55-238.000.

Engle, Thomas H., to General Signal Corporation. Hydraulic shock absorber having reserve liquid supply chamber and indicator. 4,673,063, Cl. 188-1.110.

English Electric Valve Company, Limited: *See—*
Brady, Michael B. C.; and Crook, Archie W., 4,673,896, Cl. 333-13.000.

Engstrom, Folke; and Sarkki, Juha, to A. Ahlstrom Corporation. Circulating fluidized bed reactor temperature control. 4,672,918, Cl. 122-4.00D.

Enichen, Margaret C.: *See—*
Brelsford, David P.; Cerutti, Daniel D.; Coleman, Leslie S.; Davison, Gerald A.; Dewey, Pamela H.; Enichen, Margaret C.; Hartley, Sarah T.; Malinowski, Paul A.; Rogers, Roger W.; Tallman, Peter H.; and Czak, Lynn A., 4,674,038, Cl. 364-200.000.

Enjo, Naonori; Noguchi, Masahiro; and Ide, Satoshi, to Daikin Kogyo Co., Ltd. Heat pump. 4,673,517, Cl. 252-67.000.

Enjo, Naonori: *See—*
Fukui, Shosin; Shinjo, Masayoshi; Aoyama, Hirokazu; Okazaki, Yasuko; Enjo, Naonori; and Hayashi, Kazunori, 4,673,712, Cl. 526-253.000.

Enkel Corporation: *See—*
Keene, John F.; Kuller, Bengt L.; and Kemmeter, Robert G., 4,673,142, Cl. 242-58.300.

Enquist, Lynn W.: *See—*
George, Henry J.; Krzyzek, Richard A.; Enquist, Lynn W.; and Watson, Roger J., 4,673,641, Cl. 435-68.000.

Entech, Inc.: *See—*
O'Neill, Mark J., 4,672,949, Cl. 126-440.000.

Enthone, Incorporated: *See—*
Sullivan, Thomas E.; and Kulak, Mark A., 4,673,521, Cl. 252-79.300.

Enviro-Clear Company, Inc.: *See—*
Casey, Francis J.; DePass, Ernest T.; and Gilman, Kevin R., 4,673,514, Cl. 210-783.000.

Envirodyne, Inc.: *See—*
Wong, John M., 4,673,505, Cl. 210-611.000.

Equipment Merchants International Inc.: *See—*
Hatch, Edmond K., 4,673,020, Cl. 164-40.000.

Erratico, Pietro: *See—*
Cini, Carlo; Diazzi, Claudio; and Erratico, Pietro, 4,673,889, Cl. 330-10.000.

Erxleben, Tomas, to Deutsche AG fur Unterhaltungselectronic OHG. Video camera. 4,673,267, Cl. 352-242.000.

Esper, Norbert: *See—*
Burba, Christian; Goeke, Ulrich; and Esper, Norbert, 4,673,710, Cl. 525-111.500.

Essilor International (Compagnie Generale d'Optique): *See—*
Hache, Jean C.; and Servant, Mireille, 4,673,265, Cl. 351-217.000.

ETA SA Fabriques d'Ebauches: *See—*
Juan, Alain, 4,672,742, Cl. 29-840.000.

Etablissements Lauzier: *See—*
Lauzier, Rene, 4,673,017, Cl. 160-22.000.

ETS Energy Technology Systems Inc.: *See—*
Sari, Eric T., 4,672,914, Cl. 118-641.000.

Eutectic Corporation: *See—*
Gartland, Thomas J.; and Papanide, Adrian T., 4,673,792, Cl. 219-74.000.

Evans, David A.; and Sjogren, Eric B., to Harvard University. 7-acylamino-(or 7-amino)-3-trifluoromethylsulfonyloxy-1-carba(1-dethia)-3-cephem-4-carboxylic acids and esters thereof. 4,673,737, Cl. 540-205.000.

Everitt, Delmar K.: *See—*
Goldfarb, Adolph E.; Everitt, Delmar K.; and Plakos, Drew, 4,673,370, Cl. 446-162.000.

Evers, Lawrence J.: *See—*
Bristow, Duncan J.; Achia, Biddanda U.; and Evers, Lawrence J., 4,673,485, Cl. 208-86.000.

Every, Peter; Atkins, Thomas M.; Miller, Roger L.; and Tribe, Leonard T., to Kelsey-Hayes Company. Vehicle skid control system. 4,673,226, Cl. 303-109.000.

EVG Entwicklungs- u Verwertungs-Gesellschaft m.b.H.: *See—*
Gott, Hans; Ritter, Josef; Ritter, Gerhard; and Ritter, Klaus, 4,673,786, Cl. 219-56.000.

Excelsior Fitness Equipment Co.: *See—*
Szymski, Eugene J., 4,673,177, Cl. 272-73.000.

Exide Electronics Corporation: *See—*
Raddi, William J.; Johnson, Robert W., Jr.; Tracy, John G.; and Sonnenberg, Blazej W., 4,673,825, Cl. 307-66.000.

Exxon Chemical Patents Inc.: *See—*
Haslegrave, John A.; and Sullivan, Daniel S., 4,673,436, Cl. 106-14.130.

Exxon Research and Engineering Company: *See—*
Bristow, Duncan J.; Achia, Biddanda U.; and Evers, Lawrence J., 4,673,485, Cl. 208-86.000.
Farcasiu, Dan, 4,673,769, Cl. 585-458.000.
Frain, William J., III; Hazelton, Donald R.; and Young, Edgar W., 4,673,604, Cl. 428-95.000.
Shulman, Cindy B.; and Spenadel, Lawrence, 4,673,620, Cl. 428-379.000.
Siano, Donald B.; and Bock, Jan, 4,673,716, Cl. 525-367.000.

Ezaki, Shigeo: *See—*
Sawada, Kazuo; Takano, Satoshi; and Ezaki, Shigeo, 4,673,790, Cl. 219-69.00W.

Faberge Incorporated: *See—*
Shernov, Stephen L.; Siegal, Maurice; and Markowitz, Richard, 4,673,569, Cl. 424-47.000.

Fabricius, John H.: *See—*
Landis, Donald; and Fabricius, John H., 4,672,997, Cl. 137-554.000.

Fairchild Semiconductor Corporation: *See—*
Urschel, William J.; and Sloane, Edwin A., 4,673,917, Cl. 340-347.0CC.

Fairey, Brian M.: *See—*
Mazumder, Ali T.; and Fairey, Brian M., 4,673,141, Cl. 242-75.470.

Fales, Douglas I.; and Roth, Robert A., to General Motors Corporation. Fuel pump system. 4,672,937, Cl. 123-509.000.

Fameccanica S.p.A.: *See—*
Bianco, Carlo; Colleluori, Roberto; and De Sanctis, Egidio, 4,673,136, Cl. 241-280.000.

Farace, Louis P.: *See—*
Bai, Monty W.; Titus, John D.; and Farace, Louis P., 4,673,777, Cl. 200-61.45R.

Farcasiu, Dan, to Exxon Research and Engineering Company. Composite catalyst for hydrocarbon conversion reactions. 4,673,769, Cl. 585-458.000.

Fariabi, Sepehr: *See—*
Grieger, Ronald D.; Fariabi, Sepehr; and Kolawole, Joshua O., 4,673,842, Cl. 313-292.000.

Farrar, David: *See—*
Flesher, Peter; and Farrar, David, 4,673,704, Cl. 524-519.000.

Farris, Edward T.; Barsa, John J.; Lagow, Richard J.; and Capano, Paul J. Solid calcium phosphate materials. 4,673,355, Cl. 433-218.000.

Faudi Feinbau GmbH: *See—*
Koch, Paul; and von Kunszberg, Eberhard, 4,673,499, Cl. 210-295.000.

Feast, William J.; and Winter, Jeremy N., to British Petroleum Company, p.l.c., The. Novel polymers and copolymers and production of poly(acetylene). 4,673,731, Cl. 528-503.000.

Feher, Zsofia: *See—*
Pungor, Erno; Toth, Klara S.; Feher, Zsofia; Nagy, Geza; and Horvai, Gyorgy, 4,673,295, Cl. 356-440.000.

Fehrer, Ernst. Process and apparatus for making a yarn. 4,672,800, Cl. 57-5.000.

Feldman, Fred: *See—*
Chandra, Sudhish; and Feldman, Fred, 4,673,733, Cl. 530-344.000.

Fellinger, Christine: *See—*
Stengl, Reinhard; Goesele, Ulrich; and Fellinger, Christine, 4,672,738, Cl. 29-576.00B.

Fellman, Jack D.: *See—*
Beach, Sidney C.; and Fellman, Jack D., 4,673,469, Cl. 204-38.400.

Fender, Norman N., to Graco Robotics, Inc. Universal coupling. 4,673,376, Cl. 464-158.000.

Fenn & Company: *See—*
Fenn, George S., 4,673,579, Cl. 426-321.000.

Fenn, George S., to Fenn & Company. Method of drying plants having stems and leaves. 4,673,579, Cl. 426-321.000.

Fenton, Paul V., Jr.; and Young, Thomas M., to Strato Medical Corporation. Implantable treatment reservoir. 4,673,394, Cl. 604-175.000.

Fenton, Ronald L.; and Sames, William C. Fuel tank vaporization and explosion resistant apparatus. 4,673,098, Cl. 220-88.00A.

Ferdinand Lusch GmbH & Co. KG.: *See—*
Horenkamp, Franz, 4,672,696, Cl. 5-17.000.

Ferguson, Harry D.; Lee, Kar-Kui; Oliver, William; Kwong, Fat-Cho; Young, Ronald; Hammell, Jim; Morrow, Keith; and Chaudhary, Rashid A., to General Signal Corporation. Fire alarm control and emergency communication system. 4,673,920, Cl. 340-521.000.

Ferguson, Keith T.: *See—*
Jensen, Ole R.; and Ferguson, Keith T., 4,673,401, Cl. 604-353.000.

Fergusson, Charles W.: *See—*
Swinney, Denis P.; Twizell, Norman; and Fergusson, Charles W., 4,673,498, Cl. 210-275.000.

Ferres, Harry; Smith, Richard A. G.; and Garman, Andrew J., to Beecham Group p.l.c. Novel fibrinolytic enzyme compounds. 4,673,573, Cl. 424-94.630.

Ferrofluidics Corporation: *See—*
Gowda, Hanumaiah L.; Raj, Kuldip; and Borduz, Lucian, 4,673,997, Cl. 360-107.000.

Fetsko, Daniel G.: *See*—
Graham, Lawrence D.; Skelley, Richard A.; Fetsko, Daniel G.; and Ardo, Ronald, 4,673,021, Cl. 164-122.000.

Fetty, Allan M., to Motorola, Inc. Continuous ionizer for semiconductor manufacturing processes. 4,673,443, Cl. 134-25.400.

Feuchter, Wolfgang: *See*—
Stahlecker, Fritz; and Feuchter, Wolfgang, 4,672,803, Cl. 57-401.000.

Fiedler, Paul; Braden, Rudolf; and Buding, Hartmuth, to Bayer Aktiengesellschaft. Process for selective hydrogenation of C-C double bonds in the presence of reducible, nitrogen-containing groups and new ruthenium complex compounds. 4,673,757, Cl. 558-431.000.

Field, Frank P. Display system. 4,672,757, Cl. 40-10.00R.

Field, Robert E., to United Technologies Corporation. Method of fabricating film cooling slot in a hollow airfoil. 4,672,727, Cl. 29-156.80B.

Filauro, Paolo; and Musso, Giorgio, to Elettronica San Giorgio - ELSAG S.p.A. Electronic graphic detecting head. 4,673,804, Cl. 235-463.000.

Fiore, Joseph V.: *See*—
Ostreicher, Eugene A.; Knight, Rodney A.; Fiore, Joseph V.; Emond, George T.; and Hou, Kenneth C., 4,673,504, Cl. 210-500.220.

Fischer, Michael T., to Sundstrand Data Control, Inc. Navigation point locating system. 4,674,051, Cl. 364-443.000.

Fishman, Steven, to Colgate-Palmolive Company. Dispenser for retaining toothbrush and floss. 4,673,106, Cl. 222-80.000.

Fiumi, Fabrizio. Display of subtitles during the screening of a motion picture. 4,673,266, Cl. 352-90.000.

Flaitz, Philip L.: *See*—
Churchwell, Robert W.; Flaitz, Philip L.; and Humenik, James N., 4,672,739, Cl. 29-589.000.

Flakt AB: *See*—
Goransson, Rolf; and Stomberg, Henrik, 4,673,417, Cl. 55-148.000.

Flanagin, Stephen D.; Bubb, Howard G.; and Scantlin, John R., to Telex Computer Products, Inc. PBX telephone system I/O interface. 4,674,082, Cl. 370-60.000.

Flesher, Peter; and Farrar, David, to Allied Colloids Limited. Aqueous polymer dispersions. 4,673,704, Cl. 524-519.000.

Flight, Robert S.: *See*—
Newton, W..nam P.; and Flight, Robert S., 4,672,713, Cl. 16-197.000.

Floyd, Terry S.; and Hargett, Wyatt P., Jr., to CEM Corporation. Self-regulating valve. 4,672,996, Cl. 137-522.000.

Fluor Corporation: *See*—
Subramanian, Mahadevan; Monday, Richard D.; Johnson, David B.; and Kleinschrodt, Frank J., 4,673,490, Cl. 208-354.000.

Fluorocarbon Company: *See*—
Hanson, Larry K.; and Pritchett, Gregory M., 4,673,187, Cl. 277-26.000.

Flusberg, Allen M.: *See*—
Rokni, Mordechai; and Flusberg, Allen M., 4,673,257, Cl. 350-354.000.

Flynn, Daniel P.; and Ranford, Alan B., to Sherwood Medical Company. Tube clamping device. 4,673,161, Cl. 251-10.000.

Flynn, Daniel R.: *See*—
Blessing, Gerald V.; and Flynn, Daniel R., 4,672,851, Cl. 73-597.000.

FMC Corporation: *See*—
Dean, Arthur L.; Kraft, Robert E.; and Marshall, Kenneth M., 4,673,833, Cl. 310-29.000.

Focus Semiconductor Systems, Inc.: *See*—
Mahawili, Imad, 4,673,799, Cl. 219-399.000.

Folch, Carlos M.: *See*—
Rosell, Jorge E.; and Folch, Carlos M., 4,672,884, Cl. 91-375.00R.

Forrest, John R., to Telefonaktiebolaget L M Ericsson. Test apparatus in a radar system. 4,673,939, Cl. 342-174.000.

Fortier, Guy. Surface covering extruded panel strip. 4,672,789, Cl. 52-520.000.

Foseco International Limited: *See*—
Withers, Christopher J.; and Pattle, David W., 4,673,434, Cl. 75-61.000.

Foss Manufacturing Co., Inc.: *See*—
Goodwin, Robert F., 4,673,616, Cl. 428-289.000.
Murphy, Richard; and Capron, John, 4,673,615, Cl. 428-286.000.

Fountain, William D., to Cooper Lasersonics, Inc. Distributed-feedback dye laser. 4,674,097, Cl. 372-54.000.

Fox Chase Cancer Center: *See*—
Venkateswaran, Pinayur S.; Millman, Irving; and Blumberg, Baruch S., 4,673,575, Cl. 424-195.100.

Fox, Harvey Z. Feeder. 4,672,917, Cl. 119-52.0AF.

Fox, Robert J., to Barnes Drill Co. Fixed filter drum and movable scraper. 4,673,502, Cl. 210-413.000.

Frain, William J., III; Hazelton, Donald R.; and Young, Edgar W., to Exxon Research & Engineering Co. Extrusion coated carpet backing and method of manufacture. 4,673,604, Cl. 428-95.000.

Frampton, Jeffery A., to Idex Limited (Jersey). Frame for a vehicle sun roof. 4,672,783, Cl. 52-224.000.

Franceschini, Stefano: *See*—
Cianciavicchia, Domenico; and Franceschini, Stefano, 4,673,927, Cl. 340-621.000.

Frank Mayer & Associates: *See*—
Crosslen, Louis J., 4,673,090, Cl. 211-183.000.

Frankel, Alfred R., to Renbec International Corporation. Automatic intubation device for guiding endotracheal tube into trachea. 4,672,960, Cl. 128-200.260.

Frazier, Clifton L. Method and apparatus for holding an electrical device proximate to a side rail of a bed. 4,672,703, Cl. 5-503.000.

Freiborg, Bennie. Multi-piece asphalt composition roofing system. 4,672,790, Cl. 52-521.000.

Frenken, Hans: *See*—
Koepke, Gunther; Frenken, Hans; and Friedsam, Josef, 4,673,782, Cl. 219-10.55M.

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See*—
Zeitsch, Karl J., 4,673,464, Cl. 202-158.000.

Friedsam, Josef: *See*—
Koepke, Gunther; Frenken, Hans; and Friedsam, Josef, 4,673,782, Cl. 219-10.55M.

Frito-Lay, Inc.: *See*—
Fulcher, John, 4,673,581, Cl. 426-531.000.

Froehlich, Peter, to Hilti Aktiengesellschaft. Anchor dowel assembly. 4,673,320, Cl. 411-21.000.

Frohling, Werner: *See*—
Iniotakis, Nicolaos; von der Decken, Claus-Benedict; Hecker, Rudolf; Frohling, Werner; and Schulten, Rudolf, 4,673,547, Cl. 376-314.000.

Fruth, Rupert; Stemmer, Gottfried; and Pohl, Claus, to Geimuplast Peter Mundt GmbH & Co. KG. Method of automatically detecting the locations of the frame lines of a reversal film and apparatus for carrying out the method. 4,673,815, Cl. 250-548.000.

Fuchs Systemtechnik GmbH: *See*—
Ehle, Joachim, 4,674,102, Cl. 373-98.000.

Fuji Electric Company Ltd.: *See*—
Shin, Shigeo; Takatsu, Tamao; Saito, Teiichiro; Kikuchi, Akiyoshi; and Nakanishi, Tsuneo, 4,673,123, Cl. 228-263.130.

Fuji Electric Corporate Research: *See*—
Shin, Shigeo; Takatsu, Tamao; Saito, Teiichiro; Kikuchi, Akiyoshi; and Nakanishi, Tsuneo, 4,673,123, Cl. 228-263.130.

Fuji Jukogyo Kabushiki Kaisha: *See*—
Abe, Kunihiro, 4,672,935, Cl. 123-339.000.
Abe, Kunihiro, 4,672,936, Cl. 123-239.000.
Morimoto, Yoshihiko, 4,672,864, Cl. 74-866.000.
Sumi, Kiyohide, 4,672,930, Cl. 123-182.000.

Fuji Photo Film Co., Ltd.: *See*—
Hashimoto, Hiroshi; Okita, Tsutomu; and Hibino, Noburo, 4,673,590, Cl. 427-44.000.
Kato, Mikihiko; Kato, Shinichi; Komatsu, Kazunori; and Komine, Shigeo, 4,672,913, Cl. 118-623.000.
Kunichika, Kenji; Kagawa, Yoshikatsu; Ohishi, Chikashi; Nakao, Sho; and Asao, Yasuzi, 4,673,627, Cl. 430-49.000.
Nishizawa, Jun-ichi, 4,673,985, Cl. 358-213.120.
Okamura, Hisashi; Kawamoto, Hiroshi; and Shiraishi, Hisashi, 4,673,632, Cl. 430-510.000.
Shirahata, Ryuji; Arai, Yoshihiro; and Yasunaga, Tadashi, 4,673,610, Cl. 428-213.000.

Fujii, Kanenaga: *See*—
Yamashita, Hiroshi; Fujii, Kanenaga; Hayakawa, Junji; Komiyama, Toru; and Tamaru, Sinji, 4,673,243, Cl. 350-96.150.

Fujii, Takayoshi: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,673,669, Cl. 514-42.000.

Fujiki, Hironao; Yamaguchi, Koichi; and Yamamoto, Yasushi, to Shin-Etsu Chemical Co., Ltd. Surface-releasing agent against sticking adhesive. 4,673,621, Cl. 428-420.000.

Fujimoto, Etsuo, to Tokyo Roki Co., Ltd. Variant length pleated filter element. 4,673,503, Cl. 210-493.100.

Fujinawa, Tomoaki: *See*—
Nohara, Fujio; and Fujinawa, Tomoaki, 4,673,747, Cl. 546-334.000.

Fujisawa Pharmaceutical Co., Ltd.: *See*—
Ueda, Ikuo; Shiokawa, Youichi; and Manabe, Takashi, 4,673,676, Cl. 514-267.000.

Fujita, Tadashi: *See*—
Abe, Fumio; Hasegawa, Hiroshi; Fujita, Tadashi; and Maeda, Makoto, 4,673,349, Cl. 431-328.000.

Fujita, Taiji: *See*—
Ohzono, Kohei; Saito, Mitsuru; Hayashi, Kiyotaka; and Fujita, Taiji, 4,673,379, Cl. 474-28.000.

Fujitsu Limited: *See*—
Matsui, Showgo; and Kobayashi, Kenichi, 4,673,816, Cl. 250-556.000.
Shirai, Kazunari; Kamioka, Hajime; and Koike, Shigeyoshi, 4,672,740, Cl. 29-590.000.
Tamano, Michio; and Kawasaki, Yoshiaki, 4,672,735, Cl. 29-564.600.

Fujiwara, Akihiro: *See*—
Amikura, Takashi; and Fujiwara, Akihiro, 4,673,806, Cl. 250-201.000.

Fukami, Akira: *See*—
Sakakibara, Nobuyoshi; Hattori, Tadashi; Miura, Kazuhiko; Noguchi, Hiroki; Fukami, Akira; and Nabeta, Teiichi, 4,673,416, Cl. 55-137.000.

Fukuda, Tsuyoshi; Suzuki, Masayuki; and Kiuchi, Masayoshi, to Canon Kabushiki Kaisha. Mirror device for a camera. 4,673,278, Cl. 354-479.000.

Fukui, Masaru: *See*—
Ishizumi, Kikuo; Ohashi, Naohito; Tanno, Norihiko; Sato, Hiromi; Fukui, Masaru; and Morisada, Shinya, 4,673,668, Cl. 514-34.000.

Fukui, Shosin; Shinjo, Masayoshi; Aoyama, Hirokazu; Okazaki, Yasuko; Enjo, Naonori; and Hayashi, Kazunori, to Daikin Industries Ltd. Perfluoroalkylvinyl polymer and production and use thereof. 4,673,712, Cl. 526-253.000.

Fukumoto, Hiroshi; Tanaka, Katsuhiko; and Kawagishi, Yoji, to Canon Kabushiki Kaisha. Toner, charge-imparting material and composition containing metal complex. 4,673,631, Cl. 430-110.000.
Fukunaga, Takeshi: *See*—
Yoshida, Daisuke; Tanno, Tomiya; and Fukunaga, Takeshi, 4,672,811, Cl. 60-449.000.
Fulcher, John, to Frito-Lay, Inc. Fried food product fried in synthetic cooking oils containing dicarboxylic acid esters. 4,673,581, Cl. 426-531.000.
Fullmann, Heinz-Josef: *See*—
Nielinger, Werner; Brinkmeyer, Hermann; Binsack, Rudolf; Bottenbruch, Ludwig; and Fullmann, Heinz-Josef, 4,673,728, Cl. 528-339.000.
Funabashi, Motohisa: *See*—
Shioya, Makoto; Sekozawa, Teruji; Funabashi, Motohisa; Ishida, Masahiro; and Tokuda, Hiroatsu, 4,674,028, Cl. 364-148.000.
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Roberts, Peter; and Chung, Sydney, 4,673,058, Cl. 181-266.000.
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Gentry, Gene E.; and Bain, John H., Jr., 4,673,934, Cl. 342-8.000.
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Ekchian, Jack A.; Hoffman, Robert W.; Ekchian, Leon; and Gabriel, Kaigham J., 4,673,932, Cl. 340-825.540.
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Maurer, Thomas; and Devrient, Ludwig, 4,672,891, Cl. 101-32.000.
Garceau, Roger: *See*—
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Gardena Kress & Kastner GmbH: *See*—
Prestele, Erich; Schneider, Alfred; Hepperle, Willi; Katzer, Johann; Stephany, Christian; and Lopic, Franz, 4,673,307, Cl. 401-289.000.
Gardlund, Zachariah G.; and Bator, MaryAnn, to General Motors Corporation. High impact nylon/polyurea copolymer. 4,673,722, Cl. 528-73.000.
Gardner, Donald S.; Saraswat, Krishna C.; and Barbee, Troy W., Jr., to Leland Stanford Junior University, The Board of Trustees of the. Layered and homogeneous films of aluminum and aluminum/silicon with titanium and tungsten for multilevel interconnects. 4,673,623, Cl. 428-620.000.
Garfield, Nathaniel H.: *See*—
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Garman, Andrew J.: *See*—
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Garman, Catherine E. Quick release infant body restraint. 4,672,958, Cl. 128-134.000.
Garner, Terry N.: *See*—
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Small, Leonard E.; Garrison, Paul H., Jr.; Winkler, William M.; Seaman, Sharon A.; and Papa, Alyce J., 4,673,525, Cl. 252-132.000.
Gartland, Thomas J.; and Papanide, Adrian T., to Eutectic Corporation. Gas-constricted arc nozzle. 4,673,792, Cl. 219-74.000.
Gas Research Institute: *See*—
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Cox, David, 4,673,561, Cl. 423-559.000.
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Hagler, Herbert K., 4,672,797, Cl. 53-467.000.
Gater, Arnold C.; and Hu, Thomas S. S., to Kwikset Corporation. Doorlatch knob assembly having front end loading. 4,672,829, Cl. 70-472.000.
Gates, Paul E., to GTE Products Corporation. Ruggedized mount structure for tungsten halogen lamp. 4,673,840, Cl. 313-25.000.
Gaucher, Jean-Claude, to Commissariat a l'Energie Atomique. Optical device with a high collection efficiency and cytofluorimeter making use of the same. 4,673,289, Cl. 356-72.000.
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Gebhard Balluff Fabrik Feinmechanischer Erzeguisse GmbH & Co.: *See*—
Sommer, Gerhard, 4,673,827, Cl. 307-116.000.
GEC Avionics Limited: *See*—
Hunter, Ian; Mason, Graham; and Scorer, Michael, 4,673,298, Cl. 374-122.000.
Geiger, Jean-Francois, to S.A.M.M.-Societe d'Applications des Machines Motrices. Device for the electric low-voltage driving of a rotatable mass having high inertia and a motor which is part of said device. 4,673,852, Cl. 318-341.000.
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Fruth, Rupert; Stemmer, Gottfried; and Pohl, Claus, 4,673,815, Cl. 250-548.000.
Gelbman, Lawrence F. Concrete block additive and improved concrete blocks produced therewith. 4,673,437, Cl. 106-97.000.
Gellert, Dale A.: *See*—
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General Dynamics, Pomona Division: *See*—
Inglis, Ronald T., 4,673,146, Cl. 244-3.230.
Maudal, Inge, 4,674,029, Cl. 364-148.000.
Reh, Kim R., 4,672,838, Cl. 73-9.000.
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Bradley, Irving; and Hanson, James M., 4,674,017, Cl. 362-349.000.
Bullock, Donald F.; and Wilson, Austin F., 4,673,873, Cl. 324-137.000.
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Grieger, Ronald D.; Fariabi, Sepehr; and Kolawole, Joshua O., 4,673,842, Cl. 313-292.000.
Jespersen, Nils V.; and Quine, John P., 4,673,899, Cl. 333-137.000.
Lavens, Thomas R.; Corrigan, Francis R.; Shott, Richard L.; and Bovenkerk, Harold P., 4,673,414, Cl. 51-293.000.
Lee, Albert C., 4,673,907, Cl. 336-92.000.
Ortiz, Angel L., Jr., 4,673,795, Cl. 219-121.00L.
Pisano, Alan D., 4,672,806, Cl. 60-39.030.
Premerlani, William J., 4,674,062, Cl. 364-602.000.
Rock, John A.; Durfee, Norman E., Jr.; and Johnson, Robert O., 4,673,708, Cl. 525-66.000.
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Beckwith, John R., 4,672,715, Cl. 16-334.000.
Bilak, Vasil, 4,672,993, Cl. 137-322.000.
Byford, Trevor K., 4,673,144, Cl. 242-107.40C.
Chana, Howard E., 4,672,862, Cl. 74-843.000.
Darling, Richard S.; Goodrich, Stanley R., Jr.; and Holzhausen, Alan D., 4,673,051, Cl. 180-132.000.
Disser, Robert J., 4,673,851, Cl. 318-341.000.
Drewek, David F., 4,673,205, Cl. 293-132.000.
Fales, Douglas I.; and Roth, Robert A., 4,672,937, Cl. 123-509.000.
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Giacomazzi, Roy A.; and Rich, Gregory E., 4,673,009, Cl. 141-198.000.
Haerr, Timothy A.; and Parker, Donald L., 4,673,000, Cl. 137-860.000.

Kade, Alexander, 4,673,225, Cl. 303-100.000.
Krehan, Peter; and Oppelt, Werner, 4,673,192, Cl. 280-668.000.
Lam, Michael K.; Kazewych, Bohdan; and Kobrehel, Michael D., 4,672,771, Cl. 49-352.000.
Licata, Joseph P.; and Kudla, David P., 4,672,709, Cl. 15-250.270.
McCabe, Robert W.; and Mitchell, Patricia J., 4,673,556, Cl. 423-213.500.
McCartney, Charles P.; Susko, Edward W.; and Crouse, Joseph T., 4,673,625, Cl. 429-187.000.
Miller, Gary T., 4,673,337, Cl. 417-273.000.
Parker, Donald L., 4,672,860, Cl. 74-512.000.
Pozniak, Donald J., 4,672,843, Cl. 73-117.300.
Rusch, Randy A., 4,673,965, Cl. 357-43.000.
Schrom, Ralf-Henning; and Trutter, Walter P., 4,672,730, Cl. 29-241.000.
Staub, Vincent M., Jr., 4,673,069, Cl. 188-331.000.
Wigner, Lauren R.; and Pandak, Zoltan I., 4,673,542, Cl. 264-46.700.

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Paulsen, Dean R., 4,673,876, Cl. 324-208.000.

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Nimberger, Spencer M., 4,672,728, Cl. 29-157.00R.

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Engle, Thomas H., 4,673,063, Cl. 188-1.110.
Ferguson, Harry D.; Lee, Kar-Kui; Oliver, William; Kwong, Fat-Cho; Young, Ronald; Hammell, Jim; Morrow, Keith; and Chaudhary, Rashid A., 4,673,920, Cl. 340-521.000.

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Gentry, Gene E.; and Bain, John H., Jr., to Gabb Corporation. Inflatable radar reflector. 4,673,934, Cl. 342-8.000.

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Swiatlowski, George J.; Trapp, Donald P.; Liescheidt, Duane B.; McDaniel, Arden G.; and Brandt, Maurice W., 4,673,078, Cl. 198-450.000.

Gerety, Robert J.: *See*—
Seto, Belinda; and Gerety, Robert J., 4,673,634, Cl. 435-5.000.

Germer, Warren R.; and Losapio, Peter F., to General Electric Company. Packaging for electronic demand register. 4,673,872, Cl. 324-103.00R.

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Schuster, Hans K.; Heins, Jens-Peter; Gockel, Bernhard; and Schmidt, Holger, 4,672,841, Cl. 73-38.000.

Geus, Georg, to Heimann GmbH. Circuit for measuring the anode current in an X-ray tube. 4,673,884, Cl. 324-407.000.

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Grundken, Dieter; and Bruggemann, Reinhold, 4,673,079, Cl. 198-599.000.

Geyer, Jurgen; and Kegler, Ernst, to Siemens Aktiengesellschaft. Opto-electronic scanning arrangement wherein optical reflective markings form curvilinear arcs. 4,673,809, Cl. 250-231.0SE.

Ghiringhelli, Giulio: *See*—
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Giacomazzi, Roy A.; and Rich, Gregory E., to General Motors Corporation. Fuel tank venting. 4,673,009, Cl. 141-198.000.

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Gilbert, Kim T.: *See*—
Casteen, Lynn A.; Gilbert, Kim T.; Patel, Raj L.; and Snoke, Steven R., 4,673,546, Cl. 376-289.000.

Gill, Peter L.: *See*—
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Gilles, Helmut: *See*—
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Gilman, Kevin R.: *See*—
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Gingerich, David J.; Granitz, Richard F.; Rose, William H.; and Shaffer, David T., to AMP Incorporated. Motor brush assembly. 4,673,837, Cl. 310-239.000.

Giorgetta, Valerio; Poletta, Vanni; Sartori, Mario; and Siligoni, Marco, to Cselt - Centro Studi e Laboratori Telecomunicazioni S.p.A. Biasing network for multifunction bipolar integrated system. 4,673,830, Cl. 307-297.000.

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Peinemann, Klaus-Viktor, 4,673,418, Cl. 55-158.000.

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Glassco, John M. Geometrical transducer arrangements. 4,673,057, Cl. 181-144.000.

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Goede, Simon, to Zellweger Uster Ltd. Stopping mechanism for a gripper shuttle loom. 4,673,003, Cl. 139-342.000.

Goeke, Ulrich: *See*—
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Goettl, Adam D. Evaporative cooler pad assembly. 4,672,820, Cl. 62-304.000.

Goettl, Adam D. Trap for the sump drain of an evaporative cooler. 4,673,537, Cl. 261-97.000.

Goetz, Norbert: *See*—
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Gohin, Christian; and Leblond, Henri, to Badin Crouzet. Acoustic gyrometer. 4,672,848, Cl. 73-505.000.

Gold, Arthur, to Carousel Industries, Inc. Nut dispensing machine. 4,673,111, Cl. 222-305.000.

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West, John; Golemme, Attilio; and Doane, Joseph W., 4,673,255, Cl. 350-347.00V.

Gongwer, Calvin A., to Innerspace Corporation. Wall thruster and method of operation. 4,672,807, Cl. 60-222.000.

Good, Maynard L. Apparatus and method for packing bulk material in plastic bags. 4,672,794, Cl. 53-440.000.

Goodfellow, Anthony E. B., to Immediate Business Systems Inc. Portable billing machine. 4,674,056, Cl. 364-483.000.

Goodfellow, Anthony G., to W&A Bates Limited. Expandable tire building former. 4,673,457, Cl. 156-415.000.

Goodrich, Stanley R., Jr.: *See*—
Darling, Richard S.; Goodrich, Stanley R., Jr.; and Holzhausen, Alan D., 4,673,051, Cl. 180-132.000.

Goodwin, Robert F., to Foss Manufacturing Co., Inc. Moldable latex impregnated textile material. 4,673,616. Cl. 428-289.000.

Goodwin, Vernon L., to Support Systems International, Inc. Fluidized patient support system with side rail assembly. 4,672,699, Cl. 5-430.000.

Goodyear Tire & Rubber Company, The: *See*—
Warmuth, Ivan J.; and Safreed, Carl K., Jr., 4,673,168, Cl. 267-64.270.

Goosen, Mattheus F. A.; O'Shea, Geraldine M.; and Sun, Anthony M., to Connaught Laboratories Limited. Microencapsulation of living tissue and cells. 4,673,566, Cl. 424-19.000.

Goransson, Rolf; and Stomberg, Henrik, to Flakt AB. Rigid discharge electrode. 4,673,417, Cl. 55-148.000.

Gordon, Eric M.: *See*—
Varma, Ravi K.; Gordon, Eric M.; and Simpkins, Ligaya M., 4,673,685, Cl. 514-333.000.

Gordon, Eugene I., to AMP Incorporated. Channel add/drop filter-coupler. 4,673,270, Cl. 350-96.150.

Gordon, Mark G. Blood sampler device. 4,673,386, Cl. 604-48.000.

Gorman, Walter T. Liquid containment and leak detection system. 4,673,926, Cl. 340-605.000.

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Gott, Hans; Ritter, Josef; Ritter, Gerhard; and Ritter, Klaus, to EVG Entwicklungs- u Verwertungs-Gesellschaft m.b.H. Electrical resistance grid welding machine. 4,673,786, Cl. 219-56.000.

Gotz, Albert: *See*—
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Goudy, Paul R., Jr.; Cassedy, Linn W.; and Whitaker, Thomas S., to Autotrol Corporation. Tablet granulation. 4,673,527, Cl. 252-181.000.

Gould Inc.: *See*—
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Goulooze, Marinus. Hydraulic tensioning device for sailing vessel. 4,672,908, Cl. 114-214.000.

Gowda, Hanumaiah L.; Raj, Kuldip; and Borduz, Lucian, to Ferrofluidics Corporation. Electrically conductive ferrofluid bearing and seal apparatus and low-viscosity electrically conductive ferrofluid used therein. 4,673,997, Cl. 360-107.000.

Graco Robotics, Inc.: *See*—
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Graham, Lawrence D.; Skelley, Richard A.; Fetsko, Daniel G.; and Ardo, Ronald, to TRW Inc. Method and apparatus for casting articles. 4,673,021, Cl. 164-122.000.

Grahm, Robert D. Folding hand knife. 4,672,743, Cl. 30-153.000.

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Meiller, Hermann, 4,673,214, Cl. 297-408.000.
Granberg, Bertil, to Kamyr AB. Method for control of the function of a centrifugal pump. 4,673,330, Cl. 415-1.000.
Granitz, Richard F.: *See*—
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Grant, Louis R.: *See*—
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Grant, Michael L., to U.S. West Enterprises, Inc. Universal building entrance terminal. 4,673,771, Cl. 174-38.000.
Grant, Willie T. Remote control means for heating/cooling devices. 4,673,127, Cl. 236-51.000.
Grappendorf, Richard H.: *See*—
Bigelow, Louis K.; Grappendorf, Richard H.; and Meskin, Alexander R., 4,673,044, Cl. 175-329.000.
Graubremse GmbH: *See*—
Blanz, Roland, 4,673,172, Cl. 267-64.110.
Graves, Ross E., to Hughes Aircraft Company. Autocalibrating interferometer. 4,673,944, Cl. 342-424.000.
Graystone, Jonathan A.: *See*—
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Green, Martin A.: *See*—
Nigol, Olaf; Barrett, John S.; and Green, Martin A., 4,673,775, Cl. 174-130.000.
Green, Michael J.; and McKay, James B., to British Columbia Telephone Company. Asynchronous signaling for digital communication channel. 4,674,087, Cl. 370-100.000.
Greene, Neil E.; Grubka, Lawrence J.; and Nyhart, Randall E., to Owens-Corning Fiberglas Corporation. Method and apparatus for forming glass fibers. 4,673,428, Cl. 65-2.000.
Gregory, Robert K. Foldable scaffold and method. 4,673,060, Cl. 182-82.000.
Gregory, Steven D.: *See*—
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Greiner, Richard A.: *See*—
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Greppmair, Martin, to Wacker Werke GmbH & Co. KG. Hammer having a protective cover. 4,673,043, Cl. 173-162.00H.
Greve, Christopher G.: *See*—
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Grieger, Ronald D.; Fariabi, Sepehr; and Kolawole, Joshua O., to General Electric Company. Graphite cathode cup for gridded x-ray tubes. 4,673,842, Cl. 313-292.000.
Grigo, Ulrich R.: *See*—
Krishnan, Sivaram; and Grigo, Ulrich R., 4,673,699, Cl. 524-94.000.
Grimmer, Johannes; and Horn, Hans C., to BASF Aktiengesellschaft. Preparation of riboflavin. 4,673,742, Cl. 544-251.000.
Grobbelaar, Charl J., to Arthroplasty Research & Development (Pty) Ltd. Knee prosthesis. 4,673,408, Cl. 623-20.000.
Grollier, Jean F.; Dubief, Claude; and Cauwet, Daniele, to L'Oreal. Hair-care composition and hair treatment process. 4,673,568, Cl. 424-47.000.
Grosch, Josephine; Wilson, Gary A.; Wollweber, Karen; and Yehle, Clifford O., to Miles Laboratories, Inc. Method for detection and isolation of a microorganism. 4,673,638, Cl. 435-34.000.
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Grote, Warren; and Leu, Frederick R., to American Trading and Production Corporation. Loudspeaker mounting system. 4,673,149, Cl. 248-343.000.
Grotto, Ferdinando, to Oroamerica, Inc. Lock for ornamental jewelry chain. 4,672,724, Cl. 24-616.000.
Grover, Wayne D., to Northern Telecom Limited. Method and apparatus for detecting frame synchronization. 4,674,088, Cl. 370-100.000.
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Grumman Aerospace Corporation: *See*—
Markow, Edward G., 4,673,014, Cl. 152-156.000.
Grundken, Dieter; and Bruggemann, Reinhold, to Gewerkschaft Eisenhutte Westfalia GmbH. Transfer station. 4,673,079, Cl. 198-599.000.
GTE Communication Systems Corporation: *See*—
Burns, Robert V., 4,674,117, Cl. 379-377.000.
Conforti, Joseph A., 4,674,036, Cl. 364-200.000.
Wadsworth, David L., 4,673,237, Cl. 439-607.000.
GTE Government Systems Corporation: *See*—
Kuo, Samuel C., 4,673,948, Cl. 343-792.500.
GTE Products Corporation: *See*—
Gates, Paul E., 4,673,840, Cl. 313-25.000.
Guarino, Nicholas; Onorio, Gabriel; and Ward, Billy W., to Micrion Limited Partnership. Evacuable chamber enclosing. 4,673,101, Cl. 220-335.000.
Gudmestad, Ragnar, to ARTOS Engineering Company. Adjustable apparatus for cutting and conveying wire segments of various lengths. 4,672,871, Cl. 83-151.000.
Guerra, John M., to Polaroid Corporation. Roughness measuring apparatus. 4,673,818, Cl. 250-571.000.
Gugel, Georg; and Haas, Erich, to Kraftwerk Union Aktiengesellschaft. Test manipulator externally applicable to a pipe. 4,672,852, Cl. 73-622.000.
Guigan, Jean. Method of performing biological analyses using immunological reactions, and apparatus for performing the method. 4,673,653, Cl. 436-8.000.
Guim, Raul. Fuse cap warning light. 4,673,928, Cl. 340-638.000.
Guittard, George V.; Deters, Joseph C.; Theeuwes, Felix; and Cortese, Richard, to Alza Corporation. Osmotic system with instant drug availability. 4,673,405, Cl. 604-890.000.
Gunnip, Frank L.: *See*—
Tabereaux, Alton T.; and Gunnip, Frank L., 4,673,478, Cl. 204-243.00R.
Gupta, Anil, to Seeq Technology, Inc. Charge pump for providing programming voltage to the word lines in a semiconductor memory array. 4,673,829, Cl. 307-296.00A.
Gust, Daniel M., to Outboard Marine Corporation. Water pump for marine propulsion devices. 4,673,359, Cl. 440-88.000.
Gustavsson, Bengt. Pressure balancing device for sealed vessels. 4,673,404, Cl. 604-411.000.
Gusto Engineering C.V.: *See*—
Van Ketel, Hendrik, 4,673,093, Cl. 212-175.000.
Gyr Zug AG: *See*—
Popovic, Radivoje; Solt, Katalin; and Berchier, Jean-Luc, 4,673,964, Cl. 357-27.000.
H. B. Fuller Company: *See*—
Krankkala, Paul L., 4,673,698, Cl. 524-47.000.
Haas, Elmer J., Jr. Device for attaching an identification tag to an ear or the like of an animal. 4,672,966, Cl. 128-330.000.
Haas, Erich: *See*—
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Haas, Roland: *See*—
Brandenstein, Manfred; Haas, Roland; and Hans, Rudiger, 4,673,301, Cl. 384-428.000.
Habig, Peter C.; and Daugherty, Ronald R., to Habig, Peter C. Waste oil drain collector and storage container kit. 4,673,081, Cl. 206-223.000.
Habu, Yasuhiro: *See*—
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Hache, Jean C.; and Servant, Mireille, to Essilor International (Compagnie Generale d'Optique). Procedure and device for automatic refractometric measurement of the degree of ametropia of a human eye. 4,673,265, Cl. 351-217.000.
Hack, Richard C.: *See*—
Wood, John W. M.; and Hack, Richard C., 4,673,659, Cl. 106-98.000.
Hadary, Joseph. Toothpick holder. 4,672,986, Cl. 132-90.000.
Haenni & Cie. AG.: *See*—
Scheuter, Felix; and Schindler, Ernst, 4,673,049, Cl. 177-209.000.
Haerr, Timothy A.; and Parker, Donald L., to General Motors Corporation. Check valve assembly. 4,673,000, Cl. 137-860.000.
Hag GF Aktiengesellschaft: *See*—
Wilkens, Jochen, 4,673,743, Cl. 544-275.000.
Hagar, Donald K.; Kennedy, Curtis V.; and Townsend, Garnold, to Eagleair, Inc. Sealing arrangement for air preheater. 4,673,026, Cl. 165-9.000.
Hage, Kees: *See*—
Chen, Kong-Chen; and Hage, Kees, 4,674,090, Cl. 371-25.000.
Hagedorn, Scott, to Celanese Corporation. Production of 2-hydroxymuconic semialdehyde. 4,673,646, Cl. 435-146.000.
Hagiuda, Yasuhiro: *See*—
Hata, Ryosuke; Yamanouchi, Shosuke; Hirose, Masayuki; Kuwabara, Hidemitsu; Mizumoto, Yasuharu; and Hagiuda, Yasuhiro, 4,673,607, Cl. 428-172.000.
Hagiwara, Isao; and Yoshida, Yukio, to Yoshida Kogyo K. K. Control system for an automatic door. 4,673,848, Cl. 318-266.000.
Hagiwara, Michiki: *See*—
Sugiyama, Yoshihiko; Nanba, Keizo; Hagiwara, Michiki; Aoki, Takeshi; Iwasaki, Shosuke; and Abiko, Tetsuo, 4,673,551, Cl. 420-535.000.
Hagler, Herbert K., to Gatan, Inc. Method and apparatus for securing and transferring grid specimens. 4,672,797, Cl. 53-467.000.
Hajnik, Dennis M.: *See*—
Meyer, Bernard H.; DiGiulio, Adolph V.; Kinslow, Joseph C.; and Hajnik, Dennis M., 4,673,694, Cl. 521-59.000.
Haker, Leroy C.; and Kitto, William. Desiccant dryer. 4,673,420, Cl. 55-179.000.
Halcyon Waterbed Inc.: *See*—
Kocsis, Andre, 4,672,701, Cl. 5-450.000.
Hall, Bradley G. Guard for skates. 4,673,196, Cl. 280-825.000.
Hall, Carlton. Rotary device. 4,673,372, Cl. 446-239.000.
Hall, Dale: *See*—
Silverthorne, Daniel F.; Hare, Claude H. M.; and Hall, Dale, 4,673,019, Cl. 160-268.00R.
Halliburton Company: *See*—
Copland, George V.; and Barrington, Burchus Q., 4,673,890, Cl. 33-178.00F.

Halonen, Heino T. K.; and Pohjonen, Jukka I., to Elevator GmbH. Bridge and stopper mechanism for an apparatus for lateral transfer of roller pallets. 4,673,326, Cl. 414-286.000.

Ham, Richard G.: *See*—
Boyce, Steven T.; and Ham, Richard G., 4,673,649, Cl. 435-240.000.

Hama, Hiroaki: *See*—
Iijima, Hitoshi; and Hama, Hiroaki, 4,672,822, Cl. 62-468.000.

Hamada, Yoneichi: *See*—
Matsuo, Kazuhiko; Hasegawa, Teruyuki; Kuwano, Seigo; Yamaguchi, Ryuji; Shiwata, Akio; Hamada, Yoneichi; Komatsu, Yoshimi; Kondo, Tsuneo; Shirotani, Yusuke; Nakashima, Hirohisa; and Matsuda, Yasuhiro, 4,674,101, Cl. 373-95.000.

Hamaguchi, Masayuki: *See*—
Takagi, Yoshito; Wakahara, Yasuyuki; Hamano, Satoru; Mori, Masanori; Hamaguchi, Masayuki; and Yoshikawa, Naoki, 4,673,838, Cl. 310-239.000.

Hamano, Satoru: *See*—
Takagi, Yoshito; Wakahara, Yasuyuki; Hamano, Satoru; Mori, Masanori; Hamaguchi, Masayuki; and Yoshikawa, Naoki, 4,673,838, Cl. 310-239.000.

Hambleton, Thomas P., to International Paper Company. Moisture barrier carton with reclosable cover. 4,673,126, Cl. 229-43.000.

Hamilton, Harriet W.; Patt, William C.; and Trivedi, Bharat K., to Warner-Lambert Company. N^6-acenaphthyl adenosines and analogs thereof. 4,673,670, Cl. 514-46.000.

Hammar, W. James; and Ofstead, Ronald F., to Minnesota Mining and Manufacturing Company. Process for thermoformed articles. 4,673,539, Cl. 264-1.100.

Hammell, Jim: *See*—
Ferguson, Harry D.; Lee, Kar-Kui; Oliver, William; Kwong, Fat-Cho; Young, Ronald; Hammell, Jim; Morrow, Keith; and Chaudhary, Rashid A., 4,673,920, Cl. 340-521.000.

Hammerschmidt, Peter: *See*—
Crass, Guenther; Bursch, Annegrete; and Hammerschmidt, Peter, 4,673,611, Cl. 428-215.000.

Hamprecht, Gerhard; Rohr, Wolfgang; and Varwig, Juergen, to BASF Aktiengesellschaft. Preparation of substituted 2-phenyl-4H-3,1-benzoxazin-4-ones. 4,673,740, Cl. 544-92.000.

Hanada, Toshiro: *See*—
Yamanishi, Kazuhiko; Shintani, Akinori; Okajima, Satoru; and Hanada, Toshiro, 4,673,635, Cl. 435-10.000.

Hancock Concrete Products Co., Inc.: *See*—
Schmidgall, Eugene D., 4,673,159, Cl. 249-159.000.

Hancock, Kendal: *See*—
Scheurer, Robert S.; and Hancock, Kendal, 4,673,365, Cl. 441-70.000.

Handa, Noboru: *See*—
Tsunoda, Akira; Tanaka, Takahiko; and Handa, Noboru, 4,673,853, Cl. 318-443.000.

Handi-Pac Inc.: *See*—
Sadaki, Hiroshi; Narita, Hirokazu; Imaizumi, Hiroyuki; Konishi, Yoshinori; Inaba, Takihiro; Hirakawa, Tatsuo; Taki, Hideo; Tai, Masaru; Watanabe, Yasuo; and Saikawa, Isamu, 4,673,738, Cl. 540-222.000.

Hannan, Peter W., to United States of America, Air Force. Integrated defense communications system antijamming antenna system. 4,673,943, Cl. 342-367.000.

Hannon, Charles N.; and Vallender, Leonard J., to Hannon, Charles N. Apparatus for forming a pilfer proof container closure. 4,673,158, Cl. 249-144.000.

Hans, Rudiger: *See*—
Brandenstein, Manfred; Haas, Roland; and Hans, Rudiger, 4,673,301, Cl. 384-428.000.

Hansen, Donald J. Cased water wells having flexible pad. 4,673,034, Cl. 166-75.100.

Hansen, Markus. Device for measuring relative jaw positions and movements. 4,673,352, Cl. 433-69.000.

Hanson, Gary R.; and Rabuse, George R., to Minnesota Mining and Manufacturing Company. Method and sheet for binding pages. 4,673,324, Cl. 412-6.000.

Hanson, James M.: *See*—
Bradley, Irving; and Hanson, James M., 4,674,017, Cl. 362-349.000.

Hanson, Larry K.; and Pritchett, Gregory M., to Fluorocarbon Company. Bimetallic spiral wound gasket. 4,673,187, Cl. 277-26.000.

Hara, Kunitaka; and Matsuo, Yoshihiro, to Honda. Radiator and oil cooling apparatus for motor vehicles. 4,673,032, Cl. 165-44.000.

Hara, Yoshiaki; and Wakabayashi, Masashi, to Yokohama Rubber Co., Ltd., The. Buckling fender. 4,673,314, Cl. 405-215.000.

Hara, Yukihiko, to Mitsui Norin Co., Ltd. Process for the production of a natural antioxidant obtained from tea leaves. 4,673,530, Cl. 252-398.000.

Harada, Hiroshi: *See*—
Matsuno, Yutaka; Hatanaka, Yasunori; Shimizu, Hirokazu; Ishigaki, Masahiro; Harada, Hiroshi; Kawada, Michihiro; and Wakita, Yasukuni, 4,673,188, Cl. 277-212.0FB.

Harada, Tokuya; and Higashiura, Tadashi, to Daikin Kogyo Co., Ltd. Novel strains of agrobacterium and preparation of cyclic (1→2)-β-D-glucan. 4,673,644, Cl. 435-101.000.

Harada, Yoshihito: *See*—
Suzuki, Masayuki; Ohara, Tsunemasa; Tosaka, Yoichi; Kobayashi, Ryuichi; Harada, Yoshihito; and Kawamura, Masaharu, 4,673,272, Cl. 354-173.110.

Harara, Mitsuhiko: *See*—
Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Kumagai, Naotake; and Tatemoto, Minoru, 4,673,193, Cl. 280-707.000.

Harbour, John, to TRW Probe Electronics Co. Ltd. Strain gauge assemblies. 4,673,047, Cl. 177-136.000.

Hardin, Philip J. High rotational speed autoreversing axially oscillating ink roller. 4,672,894, Cl. 101-348.000.

Hare, Claude H. M.: *See*—
Silverthorne, Daniel F.; Hare, Claude H. M.; and Hall, Dale, 4,673,019, Cl. 160-268.00R.

Hareng, Michel: *See*—
Hehlen, Robert; Hareng, Michel; Le Berre, Serge; and Mourey, Bruno, 4,673,256, Cl. 350-350.00S.

Hargett, Wyatt P., Jr.: *See*—
Floyd, Terry S.; and Hargett, Wyatt P., Jr., 4,672,996, Cl. 137-522.000.

Harris Corporation: *See*—
Monet, Paul E.; and Dufresne, Yves, 4,674,111, Cl. 379-58.000.

Harris, Richard M.; Valek, David A.; Toth, James M.; and Abramczyk, Richard F., to Rupublic Steel Corporation. Eddy current flaw detector having rotatable field defining sleeve for selectively enhancing induced eddy currents in a workpiece. 4,673,879, Cl. 324-240.000.

Hart, Curtis W.: *See*—
Wheeler, Michael J.; and Hart, Curtis W., 4,673,883, Cl. 324-384.000.

Hart, Thomas E. Sidehammer percussion action. 4,672,761, Cl. 42-51.000.

Hartig, Gunter, to Pierburg GmbH & Co KG. Ignition device for internal combustion engines. 4,672,928, Cl. 123-143.00B.

Hartley, Sarah T.: *See*—
Brelsford, David P.; Cerutti, Daniel D.; Coleman, Leslie S.; Davison, Gerald A.; Dewey, Pamela H.; Enichen, Margaret C.; Hartley, Sarah T.; Malinowski, Paul A.; Rogers, Roger W.; Tallman, Peter H.; and Czak, Lynn A., 4,674,038, Cl. 364-200.000.

Hartmann, Ernst-Siegfried: *See*—
Wahnschaffe, Jurgen; Hartmann, Ernst-Siegfried; Casper, Karl-Josef; zur Nieden, Achim; and Schleiermacher, Herbert, 4,672,923, Cl. 123-41.740.

Harvard University: *See*—
Evans, David A.; and Sjogren, Eric B., 4,673,737, Cl. 540-205.000.

Harvey, William P. Kayak/canoe paddle. 4,673,361, Cl. 440-101.000.

Hasegawa, Hiroshi: *See*—
Abe, Fumio; Hasegawa, Hiroshi; Fujita, Tadashi; and Maeda, Makoto, 4,673,349, Cl. 431-328.000.

Hasegawa, Isao: *See*—
Takahashi, Akira; and Hasegawa, Isao, 4,674,001, Cl. 360-137.000.

Hasegawa, Teruyuki: *See*—
Matsuo, Kazuhiko; Hasegawa, Teruyuki; Kuwano, Seigo; Yamaguchi, Ryuji; Shiwata, Akio; Hamada, Yoneichi; Komatsu, Yoshimi; Kondo, Tsuneo; Shirotani, Yusuke; Nakashima, Hirohisa; and Matsuda, Yasuhiro, 4,674,101, Cl. 373-95.000.

Hasegawa, Yukio: *See*—
Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, 4,673,692, Cl. 514-583.000.

Hashimoto, Hiroshi; Okita, Tsutomu; and Hibino, Noburo, to Fuji Photo Film Co., Ltd. Process for preparing a magnetic recording medium. 4,673,590, Cl. 427-44.000.

Hashimoto, Masakazu: *See*—
Nishiyama, Yuji; Kitano, Tateo; and Hashimoto, Masakazu, 4,673,217, Cl. 297-473.000.

Hashimoto, Shoji, to Dowa Mining Co., Ltd. Sliding wax. 4,673,597, Cl. 427-374.400.

Haslegrave, John A.; and Sullivan, Daniel S., to Exxon Chemical Patents Inc. N, S containing corrosion inhibitors. 4,673,436, Cl. 106-14.130.

Hasselmann, Detlev E. M. System and method for automatically monitoring liquid volume changes in storage tanks. 4,672,842, Cl. 73-49.200.

Hasslauer, Heinz; and Gawronski, Seweryn, to Traub GmbH. Guiding and feeding device for a work bar in a lathe. 4,672,869, Cl. 82-2.500.

Hata, Ryosuke; Yamanouchi, Shosuke; Hirose, Masayuki; Kuwabara, Hidemitsu; Mizumoto, Yasuharu; and Hagiuda, Yasuhiro, to Sumitomo Electric Industries, Ltd. Insulating polyolefin laminate paper and method for producing same, and electric power supply cable. 4,673,607, Cl. 428-172.000.

Hatanaka, Shigeto: *See*—
Takahashi, Yoshio; and Hatanaka, Shigeto, 4,673,439, Cl. 106-287.240.

Hatanaka, Yasunori: *See*—
Matsuno, Yutaka; Hatanaka, Yasunori; Shimizu, Hirokazu; Ishigaki, Masahiro; Harada, Hiroshi; Kawada, Michihiro; and Wakita, Yasukuni, 4,673,188, Cl. 277-212.0FB.

Hatch, Edmond K., to Equipment Merchants International Inc. Foundry molding machine and method. 4,673,020, Cl. 164-40.000.

Hatori, Mitsuo: *See*—
Hayano, Makoto; Nagatomo, Shigemi; Sakata, Hirotsugu; Hatori, Mitsuo; and Hattori, Hitoshi, 4,673,339, Cl. 418-15.000.

Hattori, Hitoshi: *See*—
Hayano, Makoto; Nagatomo, Shigemi; Sakata, Hirotsugu; Hatori, Mitsuo; and Hattori, Hitoshi, 4,673,339, Cl. 418-15.000.

Hattori, Kyo: *See*—
Yokoi, Tatsuhisa; Takeya, Eisaku; Hattori, Kyo; Abe, Kazuo; and Osawa, Hideyuki, 4,672,939, Cl. 123-568.000.

Hattori, Tadashi: *See*—
Sakakibara, Nobuyoshi; Hattori, Tadashi; Miura, Kazuhiko; Noguchi, Hiroki; Fukami, Akira; and Nabeta, Teiichi, 4,673,416, Cl. 55-137.000.

Taguchi, Takasi; Ueno, Yoshiki; and Hattori, Tadashi, 4,673,248, Cl. 350-166.000.

Haug, Edward W., to Barber-Colman Company. Shaper cutter with replaceable cutting wafer. 4,673,317, Cl. 407-28.000.

Haugen, Brian G.: *See*—
Cooke, William R.; Haugen, Brian G.; and Reparaz, Adolfo, 4,673,545, Cl. 376-261.000.

Hauk, Rolf, to Korf Engineering GmbH; and Voest-Alpine Aktiengesellschaft. Process for the production of pig iron. 4,673,432, Cl. 75-38.000.

Hawe, Malcolm; Marshall, David; and Walker, John R., to Allied Colloids Ltd. Thermal energy storage compositions. 4,673,520, Cl. 252-70.000.

Hawkins, James M., to BTR PLC. Exposure suit with an attached lifejacket. 4,673,366, Cl. 441-90.000.

Hayakawa, Junji: *See*—
Yamashita, Hiroshi; Fujii, Kanenaga; Hayakawa, Junji; Komiyama, Toru; and Tamaru, Sinji, 4,673,243, Cl. 350-96.150.

Hayakawa, Shoichi: *See*—
Saito, Muneo; and Hayakawa, Shoichi, 4,673,921, Cl. 340-539.000.

Hayakawa, Yoichi: *See*—
Hosono, Chihiro; Hayakawa, Yoichi; Kubo, Seitoku; Taga, Yutaka; and Nakamura, Shinya, 4,673,072, Cl. 192-3.570.

Hayama, Kenichi: *See*—
Nakanishi, Sadayuki; and Hayama, Kenichi, 4,673,164, Cl. 251-174.000.

Hayano, Makoto; Nagatomo, Shigemi; Sakata, Hirotsugu; Hatori, Mitsuo; and Hattori, Hitoshi, to Kabushiki Kaisha Toshiba. Scroll compressor with suction port in stationary end plate. 4,673,339, Cl. 418-15.000.

Hayasaka, Toshiaki: *See*—
Uchiyama, Soichi; Hayasaka, Toshiaki; and Ohbayashi, Yasuo, 4,673,693, Cl. 518-713.000.

Hayashi, Kazunori: *See*—
Fukui, Shosin; Shinjo, Masayoshi; Aoyama, Hirokazu; Okazaki, Yasuko; Enjo, Naonori; and Hayashi, Kazunori, 4,673,712, Cl. 526-253.000.

Hayashi, Kiyotaka: *See*—
Ohzono, Kohei; Saito, Mitsuru; Hayashi, Kiyotaka; and Fujita, Taiji, 4,673,379, Cl. 474-28.000.

Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, to Honda Giken Kogyo Kabushiki Kaisha. Braking system for vehicles. 4,673,221, Cl. 303-6.00R.

Hayashitani, Masao: *See*—
Orihashi, Tadaaki; Tsuji, Hiroshi; Ogawa, Kazuhiko; Hayashitani, Masao; Terada, Seiji; Miyagawa, Tsugio; and Isozaki, Hideo, 4,673,486, Cl. 208-86.000.

Hazeltine Corporation: *See*—
Louie, Chuen W.; Roelofs, Darrell D.; Volk, John L.; and Romeo, Arthur L., 4,673,847, Cl. 315-368.000.

Hazelton, Donald R.: *See*—
Frain, William J., III; Hazelton, Donald R.; and Young, Edgar W., 4,673,604, Cl. 428-95.000.

Heasley, Raymond E.: *See*—
Anderson, Harry E.; and Heasley, Raymond E., 4,673,103, Cl. 221-186.000.

Hecht, David L., to Xerox Corporation. Interpixel null suppression for optical image bars. 4,673,953, Cl. 346-108.000.

Hecker, Rudolf: *See*—
Iniotakis, Nicolaos; von der Decken, Claus-Benedict; Hecker, Rudolf; Frohling, Werner; and Schulten, Rudolf, 4,673,547, Cl. 376-314.000.

Heckmann, Siegfried, to U.S. Philips Corporation. Method of and device for measuring the attenuation in optical waveguides. 4,673,291, Cl. 356-73.100.

Hehlen, Robert; Hareng, Michel; Le Berre, Serge; and Mourey, Bruno, to Thomson-CSF. Process for controlling a matrix access display device. 4,673,256, Cl. 350-350.00S.

Heil, Guenter: *See*—
Lehner, August; Heil, Guenter; Lenz, Werner; Balz, Werner; Kohl, Albert; and Schornick, Gunnar, 4,673,591, Cl. 427-48.000.

Heimann GmbH: *See*—
Geus, Georg, 4,673,884, Cl. 324-407.000.

Heinen, Jochen; Kappeler, Franz; and Westermeier, Heinz, to Siemens Aktiengesellschaft. Laser diode array. 4,674,095, Cl. 372-50.000.

Heinrich, Peter: *See*—
Bartko, Kristine; Gabler, Dieter; Heinrich, Peter; Luckner, Joachim; and Schlenkrich, Bernd, 4,672,833, Cl. 72-111.000.

Heins, Jens-Peter: *See*—
Schuster, Hans K.; Heins, Jens-Peter; Gockel, Bernhard; and Schmidt, Holger, 4,672,841, Cl. 73-38.000.

Heinze, Walter O.; and Tufts, Wesley M., to Control Fluidics, Inc. Water saving toilet system. 4,672,689, Cl. 4-415.000.

Heinzelmann, Karl-Georg: *See*—
Ries, Gunther; and Heinzelmann, Karl-Georg, 4,673,881, Cl. 324-318.000.

Heitzig, Jurgen, to Continental Gummi-Werke Aktiengesellschaft. Elastic motor mount. 4,673,169, Cl. 267-140.100.

Heldenbrand, Stanley W., to Northern Telecom Limited. Hook switch actuator assembly. 4,674,120, Cl. 379-427.000.

Helios Research Corp.: *See*—
Nicodemus, Carl D., 4,673,335, Cl. 417-54.000.

Hellige GmbH: *See*—
Dinkowski, Jorg; Jeppel, Wolfgang; Moisel, Hartmut; and Spiess, Hans P., 4,674,061, Cl. 364-571.000.

Helm, John R.: *See*—
Boden, Richard M.; and Helm, John R., 4,673,533, Cl. 252-522.00R.

Hemme, Richard O. Gold bag with rotary club carrier. 4,673,082, Cl. 206-315.600.

Hemrich, William R.: *See*—
Contri, Robert F.; and Hemrich, William R., 4,673,798, Cl. 219-225.000.

Henne, Werner; and Pelger, Michael, to AKZO NV. Cleaning treatment for blood compartments of dialysators. 4,673,506, Cl. 210-636.000.

Henry, Antoine: *See*—
Anzola, Michel; Lefevre, Daniel; Massicot, Patrick; Pierre, Jacques; and Henry, Antoine, 4,673,585, Cl. 427-6.000.

Hepperle, Willi: *See*—
Prestele, Erich; Schneider, Alfred; Hepperle, Willi; Katzer, Johann; Stephany, Christian; and Lopic, Franz, 4,673,307, Cl. 401-289.000.

Herb, Armin; Huegel, Robert; and Leuthi, Rudolf. to Hilti Aktiengesellschaft. Expansion dowel. 4,673,321, Cl. 411-40.000.

Hernandez, Irene H.; Barker, Barbara A.; Himelstein, Carol S.; and Machart, Beverly H., to International Business Machines Corp. Editing business charts. 4,674,042, Cl. 364-401.000.

Hernandez, Irene H.; Barker, Barbara A.; Himelstein, Carol S.; and Machart, Beverly H., to International Business Machines Corp. Updating business chart data by editing the chart. 4,674,043, Cl. 364-401.000.

Hernandez, Irene H.: *See*—
Barker, Barbara A.; Hernandez, Irene H.; and McCaskill, Rex A., 4,674,040, Cl. 364-300.000.

Herring, Donald E.; and Wang, Lawrence C., to Mattel Inc. Transformable toy block and hinge therefor. 4,673,373, Cl. 446-378.000.

Herschel Corporation (Delaware Corp.): *See*—
Speck, Cleo T., 4,673,006, Cl. 141-1.000.

Hershenson, Harold, to Cordis Corporation. Plaque softening method. 4,672,962, Cl. 128-303.100.

Hertelendy, Chris E. Waterproof splice connector having high tensile pullout resistance. 4,673,233, Cl. 439-442.000.

Hervens, Francoise M.: *See*—
Roberfroid, Marcel B.; Viehe, Heinz G.; and Hervens, Francoise M., 4,673,690, Cl. 514-563.000.

Hettche, Helmut; Emig, Peter; and Engel, Jurgen, to Degussa Aktiengesellschaft. 2-amino-3-ethoxycarbonylamino-6-(p-fluoro-benzylamino)-pyridine gluconate and pharmaceutical preparations containing it. 4,673,666, Cl. 514-23.000.

Hiasa, Toshikazu; and Uchida, Hiroyuki, to Honda Giken Kogyo Kabushiki Kaisha. Two-cycle engine. 4,672,924, Cl. 123-65.0PE.

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Hashimoto, Hiroshi; Okita, Tsutomu; and Hibino, Noburo, 4,673,590, Cl. 427-44.000.

Hickox, Robert E., to Burr-Brown Corporation. Apparatus and method for a pressure-sensitive device. 4,672,853, Cl. 73-708.000.

Hida, Toshihiko, to Mitsubishi Denki Kabushiki Kaisha. Video cassette recorder with cassette viewing mechanism. 4,673,994, Cl. 360-85.000.

Hieber, Konrad; and Neppl, Franz, to Siemens Aktiengesellschaft. Integrated MOS transistors having a gate metallization composed of tantalum or niobium or their silicides. 4,673,968, Cl. 357-71.000.

Higashigawa, Yasuyuki: *See*—
Ikeda, Minoru; and Higashigawa, Yasuyuki, 4,674,054, Cl. 364-477.000.

Higashiura, Tadashi: *See*—
Harada, Tokuya; and Higashiura, Tadashi, 4,673,644, Cl. 435-101.000.

Higashiyama, Naotoshi: *See*—
Miura, Masami; and Higashiyama, Naotoshi, 4,674,121, Cl. 381-10.000.

Higuchi, Kunio; Miyazono, Shunichi; and Toyogucyi, Tsutomu, to Sony Corporation. Disc loading and unloading apparatus for use in a disc player. 4,674,080, Cl. 369-77.200.

Hill, George R. Unidirectional panel. 4,673,609, Cl. 428-187.000.

Hill, Lorimer K., to Siliconix Incorporated. Power supply having dual ramp control circuit. 4,674,020, Cl. 363-21.000.

Hill, Percy H., to Stratford Laboratories. Toothbrush. 4,672,706, Cl. 15-167.00R.

Hiltbrunner, Werner: *See*—
Lamping, Alfons; Karth, Beat; and Hiltbrunner, Werner, 4,673,601, Cl. 428-35.000.

Hilti Aktiengesellschaft: *See*—
Froehlich, Peter, 4,673,320, Cl. 411-21.000.
Herb, Armin; Huegel, Robert; and Leuthi, Rudolf, 4,673,321, Cl. 411-40.000.
Schiefer, Erwin, 4,673,322, Cl. 411-40.000.

Hilty, Calvin A.; and Raid, Larry J. Clothing suspension apparatus. 4,673,153, Cl. 248-231.800.

Himelstein, Carol S.: *See*—
Hernandez, Irene H.; Barker, Barbara A.; Himelstein, Carol S.; and Machart, Beverly H., 4,674,042, Cl. 364-401.000.
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Himoto, Takeshi, to Sumitomo Electric Industries Ltd. Process for forming an ohmic electrode on a p-type III-V compound semiconductor. 4,673,593, Cl. 427-89.000.

Hingorany, Premkumar, to Texas Instruments Incorporated. Surface mounted system for leaded semiconductor devices. 4,673,967, Cl. 357-70.000.

Hirai, Kazumi; Akiyoshi, Mitsuo; Nakano, Chikao; Watanabe, Kenji; and Kodama, Satoru, to Matsushita Electric Industrial Co. Ltd. Cooking apparatus with weighing device. 4,673,800, Cl. 219-518.000.

Hirakawa, Tatsuo: *See*—
Sadaki, Hiroshi; Narita, Hirokazu; Imaizumi, Hiroyuki; Konishi, Yoshinori; Inaba, Takihiro; Hirakawa, Tatsuo; Taki, Hideo; Tai, Masaru; Watanabe, Yasuo; and Saikawa, Isamu, 4,673,738, Cl. 540-222.000.

Hirao, Yoshiaki: *See*—
Nagaoka, Yoshitomi; Matsuda, Yoshiteru; Hirao, Yoshiaki; Kuga, Ryuichiro; and Asakura, Hiroyuki, 4,673,274, Cl. 354-403.000.

Hirose, Fumio: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,673,669, Cl. 514-42.000.

Hirose, Masayuki: *See*—
Hata, Ryosuke; Yamanouchi, Shosuke; Hirose, Masayuki; Kuwabara, Hidemitsu; Mizumoto, Yasuharu; and Hagiuda, Yasuhiro, 4,673,607, Cl. 428-172.000.

Hiroshima, Tatsuo: *See*—
Sakamoto, Takahide; and Hiroshima, Tatsuo, 4,673,877, Cl. 324-225.000.

Hirota, Kazuo: *See*—
Satoh, Ryohei; Oshima, Muneo; Tanaka, Minoru; Sakaguchi, Suguru; Murata, Akira; and Hirota, Kazuo, 4,673,772, Cl. 174-52.0FP.

Hirs, Gene. Disposable liner for paint booth grating. 4,673,425, Cl. 55-435.000.

Hirsch, Michael; Kristensen, Peter D.; and Dunn, William W., to Production Monitoring and Control Co. Polish rod temperature sensing system and rod stroking control. 4,672,845, Cl. 73-151.000.

Hisajima, Masahiko; Shigemura, Yutaka; Makiura, Yoshinori; and Ishito, Mitsuya, to Mita Industrial Co. Ltd. Copying machine. 4,673,283, Cl. 355-14.0SH.

Hisamitsu, Kunio; Takemoto, Tadashi; Yukawa, Toshihide; and Hisamitsu, Kunio, to Ajinomoto Co., Inc. Method for conversion of β-aspartylphenylalanine derivatives to α-aspartylphenylalanine derivatives. 4,673,744, Cl. 544-385.000.

Hisamitsu, Kunio: *See*—
Hisamitsu, Kunio; Takemoto, Tadashi; Yukawa, Toshihide; and Hisamitsu, Kunio, 4,673,744, Cl. 544-385.000.

Hitachi Automotive Engineering Co., Ltd.: *See*—
Kugo, Masaru; Igarashi, Osamu; Katogi, Kozo; Ito, Hiroshi; and Nakamura, Mamoru, 4,673,252, Cl. 350 V-339.00F.

Hitachi, Ltd.: *See*—
Funabashi, Tsuneo; Iwasaki, Kazuhiko; Yamaguchi, Noboru; Shimura, Takanori; and Tatezaki, Junichi, 4,674,037, Cl. 364-200.000.
Ito, Tetsuo; Arita, Setsuo; and Kitaura, Wataru, 4,673,974, Cl. 358-108.000.
Kugo, Masaru; Igarashi, Osamu; Katogi, Kozo; Ito, Hiroshi; and Nakamura, Mamoru, 4,673,252, Cl. 350 V-339.00F.
Satoh, Ryohei; Oshima, Muneo; Tanaka, Minoru; Sakaguchi, Suguru; Murata, Akira; and Hirota, Kazuo, 4,673,772, Cl. 174-52.0FP.
Setoyama, Eiji; Arimatsu, Keiji; and Ohshita, Youichi, 4,673,482, Cl. 204-298.000.
Shioya, Makoto; Sekozawa, Teruji; Funabashi, Motohisa; Ishida, Masahiro; and Tokuda, Hiroatsu, 4,674,028, Cl. 364-148.000.
Shiraki, Yasuhiro; Katayama, Yoshifumi; Murayama, Yoshimasa; Morioka, Makoto; Sawada, Yasushi; Mishima, Tomoyoshi; Kuroda, Takao; and Maruyama, Eiichi, 4,673,959, Cl. 357-22.000.
Uchiyama, Kaoru; and Tsutsui, Mitsukuni, 4,672,847, Cl. 73-204.000.

Hitachi Ltd: *See*—
Nakato, Hakaru; Nozaki, Tsutomu; Kinoshita, Katsuo; Habu, Yasuhiro; Ohnuma, Hiroaki; Ohmiya, Shigeru; and Kimura, Tomoaki, 4,673,024, Cl. 164-431.000.

Hitachi Zosen Corporation: *See*—
Furutera, Masaharu; Furukawa, Tetsuro; Matsushita, Yoshiaki; and Nakauchi, Kenji, 4,672,821, Cl. 62-324.200.

Hobourn-Eaton Limited: *See*—
Bristow, Ian T., 4,673,341, Cl. 418-26.000.

Hochkoenig, Manfred: *See*—
Kretschmer, Helmut; and Hochkoenig, Manfred, 4,673,206, Cl. 296-1.00S.

Hock, Darryl A.: *See*—
Kaleita, David L.; Zboralski, James A.; and Hock, Darryl A., 4,674,115, Cl. 379-201.000.

Hockaday, Robert G. Fuel cell. 4,673,624, Cl. 429-41.000.

Hodgens, Tony D.: *See*—
Barley, Thomas A.; Hodgens, Tony D.; and Rast, Gustaf J., Jr., 4,673,940, Cl. 342-192.000.

Hodgins, Lorne H. Canoe seat and oar lock unit. 4,672,911, Cl. 114-363.000.

Hoechst Aktiengesellschaft: *See*—
Crass, Guenther; Bursch, Annegrete; and Hammerschmidt, Peter, 4,673,611, Cl. 428-215.000.
Humke, Rainer, 4,673,665, Cl. 514-15.000.
Konz, Elmar; and Kaiser, Joachim, 4,673,682, Cl. 514-307.000.
Krakkay, Tibor; Poggi, Tatjana; and Schubert, Ernst, 4,673,721, Cl. 526-329.300.
Kuehnert, Egbert, 4,672,872, Cl. 83-171.000.
Puhler, Alfred; Wolleben, Wolfgang; and Leineweber, Michael, 4,673,642, Cl. 435-91.000.

Hoechst-Roussel Pharmaceuticals Inc.: *See*—
Kosley, Raymond W., Jr.; and Cherill, Robert J., 4,673,752, Cl. 549-389.000.
Shutske, Gregory M.; Setescak, Linda L.; and Allen, Richard C., 4,673,746, Cl. 546-272.000.

Hoff, Andrew M.: *See*—
Spencer, John E.; Borel, Richard A.; Linxwiler, Kenneth E.; and Hoff, Andrew M., 4,673,456, Cl. 156-345.000.

Hoffman, Robert W.: *See*—
Ekchian, Jack A.; Hoffman, Robert W.; Ekchian, Leon; and Gabriel, Kaigham J., 4,673,932, Cl. 340-825.540.

Hoffman, Timothy C. Lightweight compact chair with back support, for outdoors use. 4,673,211, Cl. 297-16.000.

Hofke, Fred, to Revlon, Inc. Device and method for determining skin type. 4,672,973, Cl. 128-665.000.

Hoguchi, Tetsuya; and Morita, Shigeru, to O-Oka Forge Co. Ltd. Method for machining clutch gear for automobile transmission. 4,672,729, Cl. 29-159.200.

Hohnstein, Dean H.; Jandovitz, John S.; and Lehoczky, Kalman N., to Siemens Energy and Automation, Inc. Stator core having waved laminations. 4,673,835, Cl. 310-217.000.

Holland Mechanics B.V.: *See*—
Damman, Cornelis C.; and Plaatsman, Jacob, 4,673,016, Cl. 157-1.240.

Hollandse Signaalapparaten B.V.: *See*—
Van Der Mark, Jacobus, 4,673,941, Cl. 342-201.000.

Holliday Amusement Company, Inc. of Charleston: *See*—
Marlow, John, 4,673,828, Cl. 307-139.000.

Holmgren, Werner. Method for continuously producing a powder filled tubular welding electrode. 4,673,121, Cl. 228-148.000.

Holzhausen, Alan D.: *See*—
Darling, Richard S.; Goodrich, Stanley R., Jr.; and Holzhausen, Alan D., 4,673,051, Cl. 180-132.000.

Homann, Helmut F.: *See*—
Piper, Robert J.; and Homann, Helmut F., 4,673,950, Cl. 343-912.000.

Honda: *See*—
Hara, Kunitaka; and Matsuo, Yoshihiro, 4,673,032, Cl. 165-44.000.

Honda Giken Kogyo Kabushiki Kaisha: *See*—
Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 4,673,221, Cl. 303-6.00R.
Hiasa, Toshikazu; and Uchida, Hiroyuki, 4,672,924, Cl. 123-65.0PE.
Kumasaka, Toru; Kamiji, Koichi; and Ohya, Toshikazu, 4,673,912, Cl. 340-52.00R.
Miyata, Takahide; Iwashita, Kanau; Taniuchi, Kazuman; Yamamoto, Hiroshi; and Nakamichi, Katsuhiro, 4,672,925, Cl. 123-65.0PE.
Nakayama, Hajime; Aoki, Osamu; Nishijima, Shigetoshi; Horiuchi, Haruo; Sugino, Takuya; and Takagi, Shuichi, 4,672,940, Cl. 123-590.000.
Ohzono, Kohei; Saito, Mitsuru; Hayashi, Kiyotaka; and Fujita, Taiji, 4,673,379, Cl. 474-28.000.
Shinozake, Takashi; and Ishikawa, Satoshi, 4,673,052, Cl. 180-219.000.
Tanaka, Osami; Tagami, Tomoyuki; and Tsunoda, Kazuhiko, 4,673,053, Cl. 180-227.000.
Uchida, Takanao, 4,672,927, Cl. 123-90.440.
Yamagata, Tetsuo, 4,672,941, Cl. 123-602.000.

Honda, Hiroo: *See*—
Murakami, Susumu; and Honda, Hiroo, 4,673,218, Cl. 299-15.000.

Honeycutt, Thomas E.: *See*—
Roberts, Thomas G.; and Honeycutt, Thomas E., 4,673,250, Cl. 350-320.000.

Honeywell Inc.: *See*—
Atherton, Jay W., 4,673,887, Cl. 330-10.000.
Beckey, Thomas J., 4,674,027, Cl. 364-143.000.
Sanders, Glen A., 4,673,293, Cl. 356-350.000.

Hong, Keum P.: *See*—
Hong, Soon Y.; and Hong, Keum P., 4,672,704, Cl. 6-10.000.

Hong, Soon Y.; and Hong, Keum P. Frame assembly for collecting royal jelly. 4,672,704, Cl. 6-10.000.

Hongu, Masayuki: *See*—
Sarugaku, Toshio; Motoe, Hisafumi; Tokuhara, Masaharu; and Hongu, Masayuki, 4,673,983, Cl. 358-183.000.

Hoofnagle, Rodger A.; and Young, William S., to Amoco Corporation. Sand separation and removal method and apparatus. 4,673,500, Cl. 210-307.000.

Hoover, John C., to Electromagnetic Sciences, Inc. Ridged waveguide to rectangular waveguide adaptor useful for feeding phased array antenna. 4,673,946, Cl. 343-776.000.

Hoppie, Lyle O.; Chute, Richard; Scharnweber, David H.; and Waichunas, Kenneth P., to Eaton Corporation. Method and apparatus for multiphasic pretreatment of fuel to achieve hypergolic combustion. 4,672,938, Cl. 123-538.000.

Horenkamp, Franz, to Ferdinand Lusch GmbH & Co. KG. Convertible sitting/reclining furniture article. 4,672,696, Cl. 5-17.000.

Horiba, Ltd.: *See*—
Yoneda, Aritoshi, 4,673,812, Cl. 250-252.100.

Horiuchi, Haruo: *See*—
Nakayama, Hajime; Aoki, Osamu; Nishijima, Shigetoshi; Horiuchi, Haruo; Sugino, Takuya; and Takagi, Shuichi, 4,672,940, Cl. 123-590.000.

Horn, Hans C.: *See*—
Grimmer, Johannes; and Horn, Hans C., 4,673,742, Cl. 544-251.000.

Hornung, Friedrich; Paule, Kurt; and Schadlich, Fritz, to Robert Bosch GmbH. Hand tool machine, in particular drilling machine. 4,673,318, Cl. 408-9.000.

Horrall, Thomas R.; and Greiner, Richard A., to Bolt Beranek and Newman Inc. Multichannel masking sound generator. 4,674,124, Cl. 381-73.100.

Horst Reinhold Wagner, Trustee, H&L Wagner Family Trust: *See*— Wagner, Horst R., 4,673,380, Cl. 474-90.000.

Horvai, Gyorgy: *See*—
Pungor, Erno; Toth, Klara S.; Feher, Zsofia; Nagy, Geza; and Horvai, Gyorgy, 4,673,295, Cl. 356-440.000.

Hoshino Gakki Co., Ltd.: *See*—
Hoshino, Yoshiki; and Matsui, Kazuhiro, 4,672,877, Cl. 84-299.000.

Hoshino, Kinshiro: *See*—
Ono, Shuichi; Aida, Satoru; and Hoshino, Kinshiro, 4,672,796, Cl. 53-449.000.

Hoshino, Shigeo, to Nissan Motor Co., Ltd. Semiconductor vibration detecting structure. 4,672,849, Cl. 73-579.000.

Hoshino, Yoshiki; and Matsui, Kazuhiro, to Hoshino Gakki Co., Ltd. Tailpiece of a guitar. 4,672,877, Cl. 84-299.000.

Hosono, Chihiro; Hayakawa, Yoichi; Kubo, Seitoku; Taga, Yutaka; and Nakamura, Shinya, to Aisin-Warner Limited; and Toyota Motor Corporation. 4-Wheel drive transmission control system. 4,673,072, Cl. 192-3.570.

Hospal A.G.: *See*—
Cianciavicchia, Domenico; and Franceschini, Stefano, 4,673,927, Cl. 340-621.000.

Hou, Kenneth C.: *See*—
Ostreicher, Eugene A.; Knight, Rodney A.; Fiore, Joseph V.; Emond, George T.; and Hou, Kenneth C., 4,673,504, Cl. 210-500.220.

Houghton, Dawn I.: *See*—
Weisman, Paul T.; Houghton, Dawn I.; and Gellert, Dale A., 4,673,402, Cl. 604-368.000.

Houghton Mifflin Company: *See*—
Kucera, Henry, 4,674,066, Cl. 364-900.000.

Houlihan, William J.; and Lee, Mark L., to Sandoz Pharmaceuticals Corp. Substituted-[hydroxy(tetrahydro)-5-oxo-(2- and 3-furanyl or 2-thienyl)alkoxyphosphinyloxy]-alkanaminium hydroxide, inner salt oxides. 4,673,672, Cl. 514-95.000.

Hourahane, Donald H., to South African Inventions Development Corporation. Surgical device. 4,672,957, Cl. 128-92.0VD.

Hozelock-ASL Limited: *See*—
Renfrew, Bruce, 4,673,199, Cl. 285-316.000.

Hsieh, Der C.; and LaBudde, Edward V., to Burroughs Corporation. Optical memory system having improved positioning and focusing control circuitry. 4,674,076, Cl. 369-32.000.

Hu, Thomas S. S.: *See*—
Gater, Arnold C.; and Hu, Thomas S. S., 4,672,829, Cl. 70-472.000.

Huang, Ing-Chung. Air and liquid pump for cushion shoes, combined a pressure scale and a ball pen. 4,673,007, Cl. 141-95.000.

Hubbard, Vance M.; and Brunson, Welton K., to Tecnol, Inc. Container for dispensing surgical masks. 4,673,084, Cl. 206-438.000.

Hubbins, Stephen: *See*—
Szczepanek, Andre; and Hubbins, Stephen, 4,674,086, Cl. 370-86.000.

Hudgens, Stephen J.: *See*—
Ovshinsky, Stanford R.; and Hudgens, Stephen J., 4,673,957, Cl. 357-2.000.

Hudson, Alan T.; Gagnon, David P.; Johns, David W., II; and Langenhein, William J., Jr., to Sippican Ocean Systems, Inc. Marine measurement device. 4,673,363, Cl. 441-1.000.

Huegel, Robert: *See*—
Herb, Armin; Huegel, Robert; and Leuthi, Rudolf, 4,673,321, Cl. 411-40.000.

Hughes Aircraft Company: *See*—
Basiulis, Algerd, 4,673,030, Cl. 165-32.000.
Graves, Ross E., 4,673,944, Cl. 342-424.000.
McAnulty, John A., Sr., 4,673,231, Cl. 439-587.000.

Hugues, Gilbert P. J. M.; and Ausnit, Steven, to Minigrip, Inc. Stabilized reclosable extruded plastic fasteners. 4,672,723, Cl. 24-587.000.

Huhman, Michael L., to Deutz-Allis Corporation. Axial flow cylinder cage with nonperforated portion above the feeder opening. 4,672,981, Cl. 130-27.00R.

Hull, John D.: *See*—
Allington, Robert W.; and Hull, John D., 4,673,334, Cl. 417-53.000.

Huls Aktiengesellschaft: *See*—
Nordsiek, Karl-Heinz; Wolpers, Jurgen; and Tornau, Johannes, 4,673,709, Cl. 525-99.000.

Hulsing, Rand H., II; Peters, Rex B.; and Steinke, Kurt E., to Sundstrand Data Control, Inc. Method of determining the difference in borehole azimuth at successive points. 4,672,752, Cl. 33-302.000.

Humenik, James N.: *See*—
Churchwell, Robert W.; Flaitz, Philip L.; and Humenik, James N., 4,672,739, Cl. 29-589.000.

Homke, Rainer, to Hoechst Aktiengesellschaft. Process for treating anestrus in ewes or beef cattle. 4,673,665, Cl. 514-15.000.

Hunt, Gary D.; and Gilles, Helmut, to Alessi Industries, Inc. Motion control apparatus for precise repeatable positioning. 4,673,261, Cl. 350-531.000.

Hunter Douglas Inc.: *See*—
Anderson, Richard N., 4,673,600, Cl. 428-12.000.

Hunter, Ian; Mason, Graham; and Scorer, Michael, to GEC Avionics Limited. Tire temperature measurement apparatus. 4,673,298, Cl. 374-122.000.

Hunting Oilfield Services (UK) Limited: *See*—
Dearden, Geoffrey C.; Speare, Edward J.; Ueno, Katsuo; and Jones, Donald N., 4,673,201, Cl. 285-333.000.

Hurley, Nancy J.: *See*—
Sias, Ralph M.; Hurley, Nancy J.; and Dalebout, Melvin W., 4,673,605, Cl. 428-120.000.

Hussain, Munir A.: *See*—
Aungst, Bruce J.; and Hussain, Munir A., 4,673,679, Cl. 514-282.000.

Hutson, James H.: *See*—
O'Brien, John A., Jr.; and Hutson, James H., 4,673,012, Cl. 144-208.00E.

Hydracine Fluid Power Limited: *See*—
Tolley, Patrick, 4,673,160, Cl. 251-129.050.

Hydrocarbon Research, Inc.: *See*—
Li, Allen S.; Eccles, Richard M.; and Ruef, Lloyd M., 4,673,552, Cl. 422-140.000.

Hyman, Edward S. Method for detecting bacteria in urine and for treating rheumatoid arthritis, essential hypertension and other diseases associated with bacteriuria. 4,673,637, Cl. 435-34.000.

Hynecek, Jaroslav, to Texas Instruments Incorporated. High well capacity CCD imager. 4,673,963, Cl. 357-24.000.

I.T.W. de France: *See*—
Ambal, Gilbert, 4,673,070, Cl. 190-108.000.

Iacoviello, John G., to Air Products and Chemicals, Inc. Stable emulsions of water resistant polyvinyl alcohol-stabilized vinyl chloride-ethylene copolymers. 4,673,702, Cl. 524-459.000.

Ichiba, Yoshiyuki, to Murata Kikai Kabushiki Kaisha. Apparatus for preventing scatter of fly in winder. 4,673,138, Cl. 242-35.50R.

Ichikawa, Ichiro: *See*—
Niwa, Kenji; and Ichikawa, Ichiro, 4,673,554, Cl. 423-63.000.

Ichikawa, Kenji: *See*—
Kondo, Tatsuhei; Ito, Kaname; Ikeda, Shoichiro; Umeno, Masayoshi; and Ichikawa, Kenji, 4,673,391, Cl. 604-141.000.

Ichikawa, Shuji: *See*—
Wakabayashi, Toshio; Takai, Makoto; Ichikawa, Shuji; Arai, Junichiro; and Murota, Seiitsu, 4,673,684, Cl. 514-327.000.

Ichiki, Shigemi: *See*—
Yamada, Hideo; Ichiki, Shigemi; Naniwa, Hisamoto; Uchida, Susumu; Kadokura, Kenji; Tsunoda, Susumu; and Nakajima, Kunio, 4,674,127, Cl. 383-6.000.

Icore International, Inc.: *See*—
Lewis, Milton R., 4,673,234, Cl. 439-469.000.

Ide, Satoshi: *See*—
Enjo, Naonori; Noguchi, Masahiro; and Ide, Satoshi, 4,673,517, Cl. 252-67.000.

Idex Limited (Jersey): *See*—
Frampton, Jeffery A., 4,672,783, Cl. 52-224.000.

Igarashi, Osamu: *See*—
Kugo, Masaru; Igarashi, Osamu; Katogi, Kozo; Ito, Hiroshi; and Nakamura, Mamoru, 4,673,252, Cl. 350 V-339.00F.

Igarashi, Ryuji; and Suzuki, Yukio, to Kabushiki Kaisha Toshiba. Compact high-frequency heating apparatus with stepped waveguide. 4,673,783, Cl. 219-10.55F.

Igarashi, Takeshi; Endo, Toshihiko; and Koshi, Isei, to Terumo Kabushiki Kaisha. Medium for lysine decarboxylation test. 4,673,636, Cl. 435-34.000.

Ihara Chemical Industry Co., Ltd.: *See*—
Morinaga, Michio; Ikeda, Akira; and Shinohara, Akira, 4,673,749, Cl. 548-490.000.

Iida, Yasuhiro: *See*—
Souda, Yutaka; Imakoshi, Shigeyoshi; Suyama, Hideo; Uchida, Hiroyuki; Iida, Yasuhiro; and Sekiya, Tetsuo, 4,673,998, Cl. 360-113.000.

Iijima, Hitoshi; and Hama, Hiroaki, to Mitsubishi Denki Kabushiki Kaisha. Refrigerating cycle apparatus. 4,672,822, Cl. 62-468.000.

Iiskola, Eero I.: *See*—
Lofgren, Barbro U.; Luciani, Luciano; Seppanen, Hanneli; Stjernberg, Maria H.; and Iiskola, Eero I., 4,673,661, Cl. 502-111.000.

Ikeda, Akira: *See*—
Morinaga, Michio; Ikeda, Akira; and Shinohara, Akira, 4,673,749, Cl. 548-490.000.

Ikeda Bussan Co., Ltd.: *See*—
Miyauchi, Fumio, 4,673,200, Cl. 285-319.000.

Ikeda, Minoru; and Higashigawa, Yasuyuki, to Sumikin Coke Company Limited. Automatic control method for coke oven working machines and fixed position control apparatus therefor. 4,674,054, Cl. 364-477.000.

Ikeda Mohando Co., Ltd.: *See*—
Nohara, Fujio; and Fujinawa, Tomoaki, 4,673,747, Cl. 546-334.000.

Ikeda, Shoichiro: *See*—
Kondo, Tatsuhei; Ito, Kaname; Ikeda, Shoichiro; Umeno, Masayoshi; and Ichikawa, Kenji, 4,673,391, Cl. 604-141.000.

Ikuta, Kunio; and Yamada, Katsunori, to Dainippon Screen Mfg. Co., Ltd. Halftone dot formation. 4,673,971, Cl. 358-75.000.

Ikuzawa, Masanori: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,673,669, Cl. 514-42.000.

Imai, Kiyoshi: *See*—
Konno, Masanori; Imai, Kiyoshi; and Dobashi, Toshihiro, 4,673,791, Cl. 219-69.00M.

Imai, Yoshikiyo; and Yasuoka, Yuji, to Omron Tateisi Electronics Co. Polarized relay. 4,673,908, Cl. 335-79.000.

Imaizumi, Hiroyuki: *See—*
Sadaki, Hiroshi; Narita, Hirokazu; Imaizumi, Hiroyuki; Konishi, Yoshinori; Inaba, Takihiro; Hirakawa, Tatsuo; Taki, Hideo; Tai, Masaru; Watanabe, Yasuo; and Saikawa, Isamu, 4,673,738, Cl. 540-222.000.
Imaizumi, Mitsuyuki: *See—*
Wake, Masayoshi; Taguchi, Osamu; and Imaizumi, Mitsuyuki, 4,673,774, Cl. 174-94.00R.
Imakoshi, Shigeyoshi: *See—*
Souda, Yutaka; Imakoshi, Shigeyoshi; Suyama, Hideo; Uchida, Hiroyuki; Iida, Yasuhiro; and Sekiya, Tetsuo, 4,673,998, Cl. 360-113.000.
Suyama, Hideo; Imakoshi, Shigeyoshi; Soda, Yutaka; Fuse, Takeyuki; Abe, Iwao; and Wakabayashi, Noboru, 4,673,999, Cl. 360-125.000.
Immediate Business Systems Inc.: *See—*
Goodfellow, Anthony E. B., 4,674,056, Cl. 364-483.000.
Imperial Chemical Industries PLC: *See—*
Bromley, Charles W. A.; and Graystone, Jonathan A., 4,673,703, Cl. 524-504.000.
Jones, Michael E. B., 4,673,725, Cl. 528-266.000.
Inaba, Masao; and Kashigi, Kazuo, to NEC Corporation. Television signal scrambling apparatus. 4,673,975, Cl. 380-14.000.
Inaba, Takihiro: *See—*
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Inco Alloys International, Inc.: *See—*
Smith, Gaylord D.; Brown, Douglas S.; Bernstein, Philip; and Weller, John E., 4,673,754, Cl. 556-137.000.
Inco Limited: *See—*
Pfeil, Leonard B., 4,673,430, Cl. 75-0.5AA.
Inculet, Ion I.; and Castle, George S. P., to Canadian Patents and Development Limited. Spraying apparatus. 4,673,132, Cl. 239-706.000.
Inductotherm Corporation: *See—*
Mortimer, John H., 4,673,025, Cl. 164-457.000.
Industrial Innovations, Inc.: *See—*
Urbani, William G., 4,672,710, Cl. 15-302.000.
Industrial Technology Research Institute: *See—*
Lee, Ming-Kwang, 4,673,531, Cl. 252-512.000.
Ingalls, Robert A. Screw rotor machine with specific lobe profiles. 4,673,344, Cl. 418-201.000.
Inglis, Ronald T., to General Dynamics, Pomona Division. Missile tail fin assembly. 4,673,146, Cl. 244-3.230.
Iniotakis, Nicolaos; von der Decken, Claus-Benedict; Hecker, Rudolf; Frohling, Werner; and Schulten, Rudolf, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Process for separation of hydrogen and/or deuterium and tritium from an inert gas flow and apparatus for effectuation of process in the cooling gas circuit of a gas-cooled nuclear reactor. 4,673,547, Cl. 376-314.000.
Innerspace Corporation: *See—*
Gongwer, Calvin A., 4,672,807, Cl. 60-222.000.
Innothera: *See—*
Robba, Max F.; and Aurousseau, Michel E., 4,673,675, Cl. 514-252.000.
Inoue, Eiichi; Shimizu, Isamu; and Komatsu, Toshiyuki, to Canon Kabushiki Kaisha. Image forming member for electrophotography. 4,673,628, Cl. 430-58.000.
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Inoue, Kiyoshi, 4,673,787, Cl. 219-69.00W.
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Inprohold Establishment: *See—*
Schlegel, Hans-Joachim, 4,673,406, Cl. 623-6.000.
Institut Merieux: *See—*
Tayot, Jean-Louis; and Tardy, Michel, 4,673,734, Cl. 530-364.000.
Insul-Rib, Inc.: *See—*
Crombie, Terence G.; and Wong, Bernard K., 4,672,888, Cl. 98-29.000.
Integral Corporation: *See—*
Berry, Johnny D., 4,673,516, Cl. 252-49.500.
Intel Corporation: *See—*
Poret, Mark; and McKinley, Jeanne, 4,674,089, Cl. 371-25.000.
Intengan, Franklin S. Hand-held fishing reel. 4,673,143, Cl. 242-96.000.
International Business Machines Corporation: *See—*
Barker, Barbara A.; Hernandez, Irene H.; and McCaskill, Rex A., 4,674,040, Cl. 364-300.000.
Breisford, David P.; Cerutti, Daniel D.; Coleman, Leslie S.; Davison, Gerald A.; Dewey, Pamela H.; Enichen, Margaret C.; Hartley, Sarah T.; Malinowski, Paul A.; Rogers, Roger W.; Tallman, Peter H.; and Czak, Lynn A., 4,674,038, Cl. 364-200.000.
Chevillat, Pierre R.; Maiwald, Dietrich G.; and Ungerboeck, Gottfried, 4,674,103, Cl. 375-13.000.
Churchwell, Robert W.; Flaitz, Philip L.; and Humenik, James N., 4,672,739, Cl. 29-589.000.
Hernandez, Irene H.; Barker, Barbara A.; Himelstein, Carol S.; and Machart, Beverly H., 4,674,042, Cl. 364-401.000.
Hernandez, Irene H.; Barker, Barbara A.; Himelstein, Carol S.; and Machart, Beverly H., 4,674,043, Cl. 364-401.000.
Lange, Frederick R.; and Rosenbaum, Walter S., 4,674,065, Cl. 364-900.000.
Stelzenmuller, William K., 4,673,977, Cl. 358-133.000.
Toyokawa, Kazuhara, 4,673,987, Cl. 358-260.000.
International Flavors & Fragrances Inc.: *See—*
Boden, Richard M.; and Helm, John R., 4,673,533, Cl. 252-522.00R.
International Paper Company: *See—*
Hambleton, Thomas P., 4,673,126, Cl. 229-43.000.
Internationale Octrooi Maatschappij "Octropfa" BV: *See—*
Schram, Cornelius J., 4,673,512, Cl. 210-748.000.
Intertherm Inc.: *See—*
Roth, James E., 4,672,818, Cl. 62-239.000.
Inui, Keita: *See—*
Nakayama, Syoichi; Inui, Keita; and Suzuki, Setsuo, 4,673,602, Cl. 428-65.000.
Ionics Incorporated: *See—*
Mandle, Robert J., 4,673,483, Cl. 204-301.000.
Irie, Hirosada; and Tukamoto, Susumu, to National Research Institute for Metals. Electron beam welding method. 4,673,794, Cl. 219-121.0ED.
Irvine Sensors Corporation: *See—*
Carson, John C.; and Clark, Stewart A., 4,672,737, Cl. 29-572.000.
Isayama, Takuro: *See—*
Ameyama, Minoru; Isayama, Takuro; Yamazaki, Hiroshi; Matsumoto, Shuzo; Katano, Yasuo; and Iwasaki, Kyuhachiro, 4,673,955, Cl. 346-140.00R.
Isco, Inc.: *See—*
Allington, Robert W.; and Hull, John D., 4,673,334, Cl. 417-53.000.
Isham, Barbara K. Articles of bedding with stretch fit ends. 4,672,702, Cl. 5-497.000.
Ishida, Masahiro: *See—*
Shioya, Makoto; Sekozawa, Teruji; Funabashi, Motohisa; Ishida, Masahiro; and Tokuda, Hiroatsu, 4,674,028, Cl. 364-148.000.
Ishigaki, Masahiro: *See—*
Matsuno, Yutaka; Hatanaka, Yasunori; Shimizu, Hirokazu; Ishigaki, Masahiro; Harada, Hiroshi; Kawada, Michihiro; and Wakita, Yasukuni, 4,673,188, Cl. 277-212.0FB.
Ishihara Chemical Co., Ltd.: *See—*
Obata, Keigo; Dohi, Nobuyasu; Okuhama, Yoshiaki; Masaki, Seishi; Okada, Yukiyoshi; and Yoshimoto, Masakazu, 4,673,470, Cl. 204-44.400.
Ishii, Shigeki: *See—*
Sugiyama, Jun; Suzuki, Akira; Terada, Kosei; Oguri, Shigenori; and Ishii, Shigeki, 4,672,876, Cl. 84-1.030.
Ishii, Toshiaki, to Mitsubishi Denki Kabushiki Kaisha. Position control system for elevator. 4,673,062, Cl. 187-134.000.
Ishikawa, Katsukiyo; Nishijima, Kanji; and Seio, Mamoru, to Nippon Paint Co., Ltd. Method for preparing a printed circuit board. 4,673,458, Cl. 156-659.100.
Ishikawa, Kazutomi, to Mori Machinery Co., Ltd. Major-minor tool shank for machine tool. 4,673,319, Cl. 409-234.000.
Ishikawa, Satoshi: *See—*
Shinozake, Takashi; and Ishikawa, Satoshi, 4,673,052, Cl. 180-219.000.
Ishito, Mitsuya: *See—*
Hisajima, Masahiko; Shigemura, Yutaka; Makiura, Yoshinori; and Ishito, Mitsuya, 4,673,283, Cl. 355-14.0SH.
Ishizumi, Kikuo; Ohashi, Naohito; Tanno, Norihiko; Sato, Hiromi; Fukui, Masaru; and Morisada, Shinya, to Sumitomo Pharmaceuticals Company. Aminonaphthacene derivatives. 4,673,668, Cl. 514-34.000.
Isoyama, Toyoshiro: *See—*
Sugimori, Shigeru; Ogawa, Tetsuya; Goto, Yasuyuki; Isoyama, Toyoshiro; Nigorikawa, Kazunori; Kitano, Kinei; Yoshida, Naoyuki; and Furukawa, Yoshito, 4,673,529, Cl. 252-299.630.
Isozaki, Hideo: *See—*
Orihashi, Tadaaki; Tsuji, Hiroshi; Ogawa, Kazuhiko; Hayashitani, Masao; Terada, Seiji; Miyagawa, Tsugio; and Isozaki, Hideo, 4,673,486, Cl. 208-86.000.
Itaba, Yasushi; Yoshino, Tadao; Yoshifuji, Yutaka; Saito, Keichiro; and Tabuchi, Jyoichi, to Toa Nenryo Kabushiki Kaisha. Polyethylene stretched film. 4,673,619, Cl. 428-338.000.
Ito, Hiroshi: *See—*
Kugo, Masaru; Igarashi, Osamu; Katogi, Kozo; Ito, Hiroshi; and Nakamura, Mamoru, 4,673,252, Cl. 350 V-339.00F.
Yoshizawa, Kenji; Komura, Hirotsugu; Kodama, Hitoshi; Ohnuki, Kazushi; Shoda, Isao; Magome, Kazuo; and Ito, Hiroshi, 4,673,846, Cl. 315-248.000.
Ito, Kaname: *See—*
Kondo, Tatsuhei; Ito, Kaname; Ikeda, Shoichiro; Umeno, Masayoshi; and Ichikawa, Kenji, 4,673,391, Cl. 604-141.000.
Ito, Shigehiro: *See—*
Tajima, Osamu; and Ito, Shigehiro, 4,674,070, Cl. 369-46.000.
Ito, Takamasa, to Sony Corporation. Teaching machine. 4,673,357, Cl. 434-311.000.
Ito, Tetsuo; Arita, Setsuo; and Kitaura, Wataru, to Hitachi, Ltd. Image transmission system. 4,673,974, Cl. 358-108.000.
Ito, Yoji: *See—*
Takeda, Tomoyuki; and Ito, Yoji, 4,673,902, Cl. 333-202.000.
Itoh, Hiroshi; and Takada, Mitsuru, to Toyota Jidosha Kabushiki Kaisha. Method and apparatus for controlling power transmission system in an automotive vehicle. 4,672,863, Cl. 74-866.000.
Itoh, Shimpei; and Sasakura, Tadao, to Nitto Boseki Co., Ltd. Two stage flameproofing of cellulosic fabric. 4,673,598, Cl. 427-412.000.
ITT Corporation: *See—*
Chea, Ramon C. W., Jr., 4,674,119, Cl. 379-400.000.
Landis, Richard C., 4,673,904, Cl. 333-238.000.

Iwai, Tomio; and Nakahama, Ryoji, to Sanshin Kogyo Kabushiki Kaisha. Mounting arrangement for outboard drive. 4,673,358, Cl. 440-61.000.

Iwasaki, Kazuhiko: *See*—
Funabashi, Tsuneo; Iwasaki, Kazuhiko; Yamaguchi, Noboru; Shimura, Takanori; and Tatezaki, Junichi, 4,674,037, Cl. 364-200.000.

Iwasaki, Kyuhachiro: *See*—
Ameyama, Minoru; Isayama, Takuro; Yamazaki, Hiroshi; Matsumoto, Shuzo; Katano, Yasuo; and Iwasaki, Kyuhachiro, 4,673,955, Cl. 346-140.00R.

Iwasaki, Shosuke: *See*—
Sugiyama, Yoshihiko; Nanba, Keizo; Hagiwara, Michiki; Aoki, Takeshi; Iwasaki, Shosuke; and Abiko, Tetsuo, 4,673,551, Cl. 420-535.000.

Iwashita, Kanau: *See*—
Miyata, Takahide; Iwashita, Kanau; Taniuchi, Kazuman; Yamamoto, Hitoshi; and Nakamichi, Katsuhiro, 4,672,925, Cl. 123-65.0PE.

Iwashita, Masao; and Tenma, Tsutomu, to Nippon Electric Co. Ltd. Data processing machine suitable for high-speed processing. 4,674,034, Cl. 364-200.000.

J. P. Tool Limited: *See*—
Rawle, Ralph H., 4,672,868, Cl. 82-2.00E.

J. Wagner AG: *See*—
Zylka, Hans-Joachim, 4,674,003, Cl. 361-235.000.

Jabil Circuit Company: *See*—
Kaleita, David L.; Zboralski, James A.; and Hock, Darryl A., 4,674,115, Cl. 379-201.000.

Jaboin, Olyn P.: *See*—
Tuttle, James N., Jr.; and Jaboin, Olyn P., 4,673,445, Cl. 148-6.15R.

Jackson, Richard L.; and John, Ansel N. Rotary trimmer. 4,672,744, Cl. 30-276.000.

Jackson, Winston J., Jr.; and Morris, John C., to Eastman Kodak Company. Poly(ester-imides) and poly(ester-imide-amides) of trimellitic anhydride and 4-(aminomethyl)cyclohexanemethanol. 4,673,726, Cl. 528-288.000.

Jago, John J., to Pilkington Brothers P.L.C. Gripper apparatus for stacking a batch of sheets. 4,673,325, Cl. 414-103.000.

Jandovitz, John S.: *See*—
Hohnstein, Dean H.; Jandovitz, John S.; and Lehoczky, Kalman N., 4,673,835, Cl. 310-217.000.

Janhonen, Veikko I. Packaging bag with selectively secured reinforcing layer. 4,674,129, Cl. 383-119.000.

Janome Sewing Machine Co., Ltd.: *See*—
Kato, Kenji, 4,672,903, Cl. 112-457.000.
Kato, Kenji; and Kato, Shoji, 4,672,904, Cl. 112-457.000.

Janssen, Petrus J.: *See*—
Van Der Giessen, Aart A.; Van Der Hulst, Victor A.; and Janssen, Petrus J., 4,673,427, Cl. 65-2.000.

Jansson, Peter A.; Rogers, Wade T.; and Schwaber, James S., to E.I. Du Pont de Nemours and Company. Electronic mosaic imaging process. 4,673,988, Cl. 358-280.000.

Janusch, Alois; Lugscheider, Walter; and Ludewig, Fritz, to Voest-Alpine Aktiengesellschaaft. Process for the disposal of settled sludge derived from a biological sewage-disposal plant. 4,673,510, Cl. 210-712.000.

Japan Tobacco & Salt Public Corporation, The: *See*—
Ono, Shuichi; Aida, Satoru; and Hoshino, Kinshiro, 4,672,796, Cl. 53-449.000.

Jarosz, John M.: *See*—
Adler, Robert; and Jarosz, John M., 4,673,918, Cl. 340-365.00P.

Jasinski, Hubert C. Gold recovery apparatus. 4,673,492, Cl. 209-477.000.

Jenkins, George M. Gas supply device, particularly for manufacturing semiconductor elements. 4,672,915, Cl. 118-124.000.

Jenness, Timothy A., to Tektronix, Inc. Image distortion correction method and apparatus. 4,673,986, Cl. 358-242.000.

Jensen, Ole R.; and Ferguson, Keith T. Male incontinence device. 4,673,401, Cl. 604-353.000.

Jeppel, Wolfgang: *See*—
Diskowski, Jorg; Jeppel, Wolfgang; Moisel, Hartmut; and Spiess, Hans P., 4,674,061, Cl. 364-571.000.

Jespersen, Nils V.; and Quine, John P., to General Electric Company. H-plane stacked waveguide power divider/combiner. 4,673,899, Cl. 333-137.000.

Jizomoto, Hiroaki, to Shionogi & Co., Ltd. Process for preparing liposome composition. 4,673,567, Cl. 424-38.000.

JMW Textiles: *See*—
Malamed, Josef, 4,672,722, Cl. 24-446.000.

John, Ansel N.: *See*—
Jackson, Richard L.; and John, Ansel N., 4,672,744, Cl. 30-276.000.

John Zink Company: *See*—
Contri, Robert F.; and Hemrich, William R., 4,673,798, Cl. 219-225.000.

Johns, David W., II: *See*—
Hudson, Alan T.; Gagnon, David P.; Johns, David W., II; and Langenhein, William J., Jr., 4,673,363, Cl. 441-1.000.

Johnson, Arnold W. Washing device. 4,672,707, Cl. 15-222.000.

Johnson, David B.: *See*—
Subramanian, Mahadevan; Monday, Richard D.; Johnson, David B.; and Kleinschrodt, Frank J., 4,673,490, Cl. 208-354.000.

Johnson, Robert O.: *See*—
Rock, John A.; Durfee, Norman E., Jr.; and Johnson, Robert O., 4,673,708, Cl. 525-56.000.

Johnson, Robert W., Jr.: *See*—
Raddi, William J.; Johnson, Robert W., Jr.; Tracy, John G.; and Sonnenberg, Blazej W., 4,673,825, Cl. 307-66.000.

Johnson, Steve A.; and Shannon, Robert R., to United States of America, Energy. Diagnostic apparatus and method for use in the alignment of one or more laser means onto a fiber optics interface. 4,673,290, Cl. 356-73.100.

Jones, Alun G.: *See*—
Davison, Alan; Brenner, David; Lister-James, John; and Jones, Alun G., 4,673,562, Cl. 424-1.100.

Jones, Donald N.: *See*—
Dearden, Geoffrey C.; Speare, Edward J.; Ueno, Katsuo; and Jones, Donald N., 4,673,201, Cl. 285-333.000.

Jones, J. D. Chain alignment tool. 4,672,751, Cl. 33-286.000.

Jones, Michael E. B., to Imperial Chemical Industries PLC. Process for the preparation of aromatic oligomers. 4,673,725, Cl. 528-266.000.

Jones, Rolin, Jr. Method of testing electronic automotive parts. 4,673,868, Cl. 324-51.000.

Jones, William A. Travelling barrel down hole pump having a gas relief probe. 4,673,338, Cl. 417-435.000.

Jorgensen, George N.; McGoldrick, Gilbert A.; and Slicer, Allan E., to Square D Company. Electrical distribution system with an improved housing. 4,673,229, Cl. 439-207.000.

Juan, Alain, to ETA SA Fabriques d'Ebauches. Process for assembling and connecting integrated circuits to circuit units and apparatus for carrying out the process. 4,672,742, Cl. 29-840.000.

Judkins, Ren S., to Verosol USA Inc. Sun blind. 4,673,018, Cl. 160-84.00R.

Jushitsuyu Taisaku Gijutsu Kenkyu Kumiai: *See*—
Orihashi, Tadaaki; Tsuji, Hiroshi; Ogawa, Kazuhiko; Hayashitani, Masao; Terada, Seiji; Miyagawa, Tsugio; and Isozaki, Hideo, 4,673,486, Cl. 208-86.000.

K & S Systems, Inc.: *See*—
Sambursky, Michael H., 4,673,776, Cl. 200-43.080.

Kabelschlepp Gesellschaft mit beschrankter Haftung: *See*—
Moritz, Werner, 4,672,805, Cl. 59-78.100.

Kabushiki Kaisha Kobe Seiko Sho: *See*—
Nakanishi, Sadayuki; and Hayama, Kenichi, 4,673,164, Cl. 251-174.000.
Okamura, Masayoshi; Matsuda, Kiyoshi; Yamada, Hiromichi; Umeda, Hiromi; and Tomimoto, Masami, 4,673,655, Cl. 436-75.000.

Kabushiki Kaisha Komatsu Seisakubsho: *See*—
Yoshida, Daisuke; Tanno, Tomiya; and Fukunaga, Takeshi, 4,672,811, Cl. 60-449.000.

Kabushiki Kaisha Nippei Toyama: *See*—
Shochi, Toshiyuki; and Nakajima, Kenei, 4,673,173, Cl. 269-32.000.

Kabushiki Kaisha Toshiba: *See*—
Ariizumi, Shoji; and Segawa, Makoto, 4,673,969, Cl. 357-71.000.
Asahina, Hiroshi; and Ogura, Ichiro, 4,674,108, Cl. 378-99.000.
Hayano, Makoto; Nagatomo, Shigemi; Sakata, Hirotsugu; Hatori, Mitsuo; and Hattori, Hitoshi, 4,673,339, Cl. 418-15.000.
Igarashi, Ryuji; and Suzuki, Yukio, 4,673,783, Cl. 219-10.55F.
Ono, Katsuhiro, 4,674,109, Cl. 378-130.000.
Ozeki, Takeshi; and Tsubura, Shinichi, 4,674,046, Cl. 364-414.000.
Saito, Suzuo, 4,673,858, Cl. 318-805.000.
Suzuki, Hideo, 4,674,105, Cl. 375-80.000.
Tanaka, Shigeru, 4,674,026, Cl. 363-160.000.
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Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Anahara, Meiji; Muramatsu, Shigeru; Takagi, Isamu; and Tuboi, Masayoshi, 4,672,804, Cl. 57-401.000.
Yokoi, Tatsuhisa; Takeya, Eisaku; Hattori, Kyo; Abe, Kazuo; and Osawa, Hideyuki, 4,672,939, Cl. 123-568.000.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
Kamigaito, Osami; Noda, Shoji; and Doi, Haruo, 4,673,587, Cl. 427-38.000.

Kabushikikaisha Hara Shokki Seisakusho: *See*—
Shimomura, Manabu, 4,672,717, Cl. 19-225.000.

Kade, Alexander, to General Motors Corporation. Anti-lock brake control system. 4,673,225, Cl. 303-100.000.

Kadokura, Kenji: *See*—
Yamada, Hideo; Ichiki, Shigemi; Naniwa, Hisamoto; Uchida, Susumu; Kadokura, Kenji; Tsunoda, Susumu; and Nakajima, Kunio, 4,674,127, Cl. 383-6.000.

Kagawa, Yoshikatsu: *See*—
Kunichika, Kenji; Kagawa, Yoshikatsu; Ohishi, Chikashi; Nakao, Sho; and Asao, Yasuzi, 4,673,627, Cl. 430-49.000.

Kagechika, Hiroshi; Tonouchi, Akira; and Kammel, Roland, to Nippon Kokan Kabushiki Kaisha. Method of electrodepositing a chromium alloy deposit. 4,673,471, Cl. 204-44.500.

Kago, Yoshiyuki: *See*—
Akita, Shigeyuki; and Kago, Yoshiyuki, 4,673,913, Cl. 340-52.00R.

Kainer, Ernst. Preburning plant for burning solid fuel materials having a high ash contents. 4,672,899, Cl. 110-234.000.

Kaiser, Joachim: *See*—
Konz, Elmar; and Kaiser, Joachim, 4,673,682, Cl. 514-307.000.

Kajimoto, Noribumi; Kawakami, Yoshio; and Takizawa, Masahiro, to TDK Electronics Co., Ltd. Magnetic recording medium. 4,673,622, Cl. 428-423.100.

Kaleita, David L.; Zboralski, James A.; and Hock, Darryl A., to Jabil Circuit Company. Programmable telephone switcher. 4,674,115, Cl. 379-201.000.

Kalmus, Leslie P.; Trojan, Donald R.; Mott, Bradley; and Strampfer, John, to Merrill Lynch, Pierce, Fenner & Smith, Inc. Automated securities trading system. 4,674,044, Cl. 364-408.000.

Kamen, Dean L., to Baxter Travenol Laboratories. Drop detecting system with focusing mirror element and vibrator. 4,673,820, Cl. 250-573.000.

Kamigaito, Osami; Noda, Shoji; and Doi, Haruo, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Method of producing a composite ceramic body. 4,673,587, Cl. 427-38.000.

Kamiji, Koichi: *See*—
Kumasaka, Toru; Kamiji, Koichi; and Ohya, Toshikazu, 4,673,912, Cl. 340-52.00R.

Kamioka, Hajime: *See*—
Shirai, Kazunari; Kamioka, Hajime; and Koike, Shigeyoshi, 4,672,740, Cl. 29-590.000.

Kamiyama, Shinji: *See*—
Mutoh, Masayuki; and Kamiyama, Shinji, 4,673,951, Cl. 346-75.000.

Kammel, Roland: *See*—
Kagechika, Hiroshi; Tonouchi, Akira; and Kammel, Roland, 4,673,471, Cl. 204-44.500.

Kamyr AB: *See*—
Granberg, Bertil, 4,673,330, Cl. 415-1.000.

Kamyr, Inc.: *See*—
Elmore, Carl L.; Sherman, Paul; and McGrath, Daniel A., 4,673,459, Cl. 159-13.100.

Kanamaru, Takeshi: *See*—
Ueyama, Masato; Kanamaru, Takeshi; Shirai, Toshikazu; and Nakano, Kiyoshi, 4,673,075, Cl. 198-339.100.

Kanazawa, Hirotaka; Tanaka, Takeshi; Furutani, Shigeki; and Miyoshi, Akihiko, to Mazda Motor Corporation. Vehicle steering system. 4,673,189, Cl. 280-91.000.

Kaneko, Akira: *See*—
Shoji, Toru; Sugiyama, Mitsuru; Takezawa, Makoto; Akiba, Yuichi; Kaneko, Akira; and Sato, Mituo, 4,673,596, Cl. 427-262.000.

Kanzaki Kokyukoki Mfg. Co., Ltd.: *See*—
Yamaoka, Kojiro; and Okada, Hideaki, 4,673,055, Cl. 180-336.000.

Kaplan, Richard D., to Standard Oil Company (Indiana). Decoking process. 4,673,442, Cl. 134-24.000.

Kappeler, Franz: *See*—
Heinen, Jochen; Kappeler, Franz; and Westermeier, Heinz, 4,674,095, Cl. 372-50.000.

Karapita, Alexander D. Suspension device. 4,673,154, Cl. 248-320.000.

Karth, Beat: *See*—
Lamping, Alfons; Karth, Beat; and Hiltbrunner, Werner, 4,673,601, Cl. 428-35.000.

Kasai, Kazumi, to Yoshida Kogyo K. K. Snap buckle. 4,672,725, Cl. 24-625.000.

Kashigi, Kazuo: *See*—
Inaba, Masao; and Kashigi, Kazuo, 4,673,975, Cl. 380-14.000.

Kashiwa, Norio: *See*—
Kioka, Mamoru; and Kashiwa, Norio, 4,673,719, Cl. 526-125.000.

Katagiri, Kazuhara; Oguchi, Yoshihiro; Ohtake, Takeshi; Arao, Kozo; Kitahara, Makoto; and Takasu, Yoshio, to Canon Kabushiki Kaisha. Photoconductive film and electrophotographic photosensitive member contains azulenium salt. 4,673,630, Cl. 430-72.000.

Katano, Yasuo: *See*—
Ameyama, Minoru; Isayama, Takuro; Yamazaki, Hiroshi; Matsumoto, Shuzo; Katano, Yasuo; and Iwasaki, Kyuhachiro, 4,673,955, Cl. 346-140.00R.

Kataoka, Isaburou, to Mitsubishi Denki Kabushiki Kaisha. Manual control device. 4,673,919, Cl. 340-365.00A.

Katayama, Yoshifumi: *See*—
Shiraki, Yasuhiro; Katayama, Yoshifumi; Murayama, Yoshimasa; Morioka, Makoto; Sawada, Yasushi; Mishima, Tomoyoshi; Kuroda, Takao; and Maruyama, Eiichi, 4,673,959, Cl. 357-22.000.

Kato, Hisao, to Mitsubishi Denki Kabushiki Kaisha. Arm device for industrial robot. 4,673,329, Cl. 414-744.00A.

Kato, Kenji, to Janome Sewing Machine Co., Ltd. Pattern input device of a sewing machine. 4,672,903, Cl. 112-457.000.

Kato, Kenji; and Kato, Shoji, to Janome Sewing Machine Co., Ltd. Device for attaching a memory cassette of a computerized sewing machine. 4,672,904, Cl. 112-457.000.

Kato, Kuniaki; and Takahashi, Mutsumi, to Tokyo Keiki Co., Ltd. Back-reflection type light diffusing apparatus. 4,673,254, Cl. 350-345.000.

Kato, Mari: *See*—
Mitsui, Kotaro; Kato, Mari; Oda, Takao; and Yoshida, Susumu, 4,673,476, Cl. 204-192.280.

Kato, Mikihiko; Kato, Shinichi; Komatsu, Kazunori; and Komine, Shigeo, to Fuji Photo Film Co., Ltd. Apparatus for making magnetic recording medium. 4,672,913, Cl. 118-623.000.

Kato, Shinichi: *See*—
Kato, Mikihiko; Kato, Shinichi; Komatsu, Kazunori; and Komine, Shigeo, 4,672,913, Cl. 118-623.000.

Kato, Shoji: *See*—
Kato, Kenji; and Kato, Shoji, 4,672,904, Cl. 112-457.000.

Kato, Yasuo: *See*—
Endoh, Seiji; Kimura, Kunio; Ohta, Toshihiko; and Kato, Yasuo, 4,673,724, Cl. 528-206.000.

Katogi, Kozo: *See*—
Kugo, Masaru; Igarashi, Osamu; Katogi, Kozo; Ito, Hiroshi; and Nakamura, Mamoru, 4,673,252, Cl. 350 V-339.00F.

Katohno, Takashi; and Koyama, Ryouhei, to Asahi Kasei Kogyo Kabushiki Kaisha. Disc for rotary encoder and method for producing same. 4,673,808, Cl. 250-231.0SE.

Katsura Roller Mfg. Co., Ltd.: *See*—
Yasukawa, Akio; and Misuna, Yoshihiro, 4,672,825, Cl. 66-194.000.

Katz, Peter: *See*—
Dietrich, Albert; Katz, Peter; and Vincken, Josef, 4,674,075, Cl. 367-173.000.

Katzer, Johann: *See*—
Prestele, Erich; Schneider, Alfred; Hepperle, Willi; Katzer, Johann; Stephany, Christian; and Lopic, Franz, 4,673,307, Cl. 401-289.000.

Kawachi, Yasunori: *See*—
Murashige, Yoshio; Yanagase, Akira; Kawachi, Yasunori; and Soga, Junko, 4,673,688, Cl. 514-554.000.

Kawada, Michihiro: *See*—
Matsuno, Yutaka; Hatanaka, Yasunori; Shimizu, Hirokazu; Ishigaki, Masahiro; Harada, Hiroshi; Kawada, Michihiro; and Wakita, Yasukuni, 4,673,188, Cl. 277-212.0FB.

Kawada, Tsutomu; and Nakamura, Yasuo, to Nakamura, Yasuo. Suture needle and its manufacturing processes. 4,672,734, Cl. 29-517.000.

Kawagishi, Yoji: *See*—
Fukumoto, Hiroshi; Tanaka, Katsuhiko; and Kawagishi, Yoji, 4,673,631, Cl. 430-110.000.

Kawaguchi, Takeshi: *See*—
Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 4,673,221, Cl. 303-6.00R.

Kawajiri, Mitugu, to Nissan Motor Co., Ltd. Air jet loom. 4,673,005, Cl. 139-435.000.

Kawakami, Yoshio: *See*—
Kajimoto, Noribumi; Kawakami, Yoshio; and Takizawa, Masahiro, 4,673,622, Cl. 428-423.100.

Kawamoto, Hiroshi: *See*—
Okamura, Hisashi; Kawamoto, Hiroshi; and Shiraishi, Hisashi, 4,673,632, Cl. 430-510.000.

Kawamura, Atsushi, to Ricoh Company, Ltd. Wide angle lens system having short overall length. 4,673,259, Cl. 350-465.000.

Kawamura, Masaharu: *See*—
Suzuki, Masayuki; Ohara, Tsunemasa; Tosaka, Yoichi; Kobayashi, Ryuichi; Harada, Yoshihito; and Kawamura, Masaharu, 4,673,272, Cl. 354-173.110.

Kawamura, Mitsuyoshi: *See*—
Taniguchi, Masato; Nishio, Hisaharu; Kawamura, Mitsuyoshi; and Okumura, Toshio, 4,672,933, Cl. 123-270.000.

Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Shirai, Tetsuaki, 4,672,922, Cl. 123-41.660.

Kawasaki, Satoshi: *See*—
Namiki, Yasuomi; and Kawasaki, Satoshi, 4,673,991, Cl. 360-14.100.

Kawasaki Steel Corporation: *See*—
Dearden, Geoffrey C.; Speare, Edward J.; Ueno, Katsuo; and Jones, Donald N., 4,673,201, Cl. 285-333.000.
Nakato, Hakaru; Nozaki, Tsutomu; Kinoshita, Katsuo; Habu, Yasuhiro; Ohnuma, Hiroaki; Ohmiya, Shigeru; and Kimura, Tomoaki, 4,673,024, Cl. 164-431.000.

Kawasaki, Yoshiaki: *See*—
Tamano, Michio; and Kawasaki, Yoshiaki, 4,672,735, Cl. 29-564.600.

Kawashima, Kiyoshi: *See*—
Bannai, Saburo; and Kawashima, Kiyoshi, 4,674,053, Cl. 364-476.000.

Kawata, Hiroitsu; Aruga, Masayoshi; Ohmura, Tadayoshi; Sonobe, Takashi; Yoneya, Satoru; and Sone, Chiharu, to Yamanouchi Pharmaceutical Co., Ltd. Sustained release pharmaceutical composition of solid medical material. 4,673,564, Cl. 424-494.000.

Kazewych, Bohdan: *See*—
Lam, Michael K.; Kazewych, Bohdan; and Kobrehel, Michael D., 4,672,771, Cl. 49-352.000.

Kearney & Trecker Corporation: *See*—
Mattson, Clyde E., 4,673,076, Cl. 198-346.200.

Keene, John F.; Kuller, Bengt L.; and Kemmeter, Robert G., to Enkel Corporation. Apparatus for continuously supplying a web of sheet material. 4,673,142, Cl. 242-58.300.

Kegler, Ernst: *See*—
Geyer, Jurgen; and Kegler, Ernst, 4,673,809, Cl. 250-231.0SE.

Keime, Bernard M. Portable self-contained injector for perfusions, particularly in the case of road accident victims. 4,673,392, Cl. 604-141.000.

Kelleher, Thomas J.; and Nix, Paul T., to CooperBiomedical, Inc. Method of determining cystic fibrosis ciliostatic factor. 4,673,633, Cl. 435-4.000.

Keller, Jack; and Stringham, Glen E., to Utah State University Foundation. Method and system for furrow irrigation. 4,673,128, Cl. 239-1.000.

Keller, John T.: *See*—
Compton, Russell A.; Keller, John T.; McBride, Thomas R.; and Kramer, David M., 4,673,880, Cl. 324-309.000.

Keller-Mullett Technology: *See*—
Martinelli, Robert M., 4,674,019, Cl. 363-20.000.

Keller, Roger L. Spring loaded clothes hanger. 4,673,116, Cl. 223-94.000.

Kellett, George W.: *See*—
Smith, James A.; and Kellett, George W., 4,673,523, Cl. 252-91.000.

Kelley, William, to Mattel, Inc. Articulated limb assemby for figure toy. 4,673,374, Cl. 446-383.000.

Kelly, Bill A.: *See*—
Lemon, Chester L.; and Kelly, Bill A., 4,674,041, Cl. 364-401.000.

Kelsey-Hayes Company: *See*—
Every, Peter; Atkins, Thomas M.; Miller, Roger L.; and Tribe, Leonard T., 4,673,226, Cl. 303-109.000.

Kemmeter, Robert G.: *See—*
Keene, John F.; Kuller, Bengt L.; and Kemmeter, Robert G., 4,673,142, Cl. 242-58.300.

Kennedy Company: *See—*
Spiegelstein, Wolfgang, 4,673,995, Cl. 360-93.000.

Kennedy, Curtis V.: *See—*
Hagar, Donald K.; Kennedy, Curtis V.; and Townsend, Garnold, 4,673,026, Cl. 165-9.000.

Kent, William H.; and Steel, Robert C., to Gas Research Institute. Rotation sensor. 4,672,753, Cl. 33-366.000.

Kenway, Sidney, to Eaton Corporation. Sealed rectangular pushbutton switch. 4,673,780, Cl. 200-302.200.

Kerber, Michael M.; and Brunnett, Carl J., to Picker International Inc. Filter for data processing. 4,674,045, Cl. 364-414.000.

Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See—*
Iniotakis, Nicolaos; von der Decken, Claus-Benedict; Hecker, Rudolf; Frohling, Werner; and Schulten, Rudolf, 4,673,547, Cl. 376-314.000.

Kervagoret, Gilbert, to Bendix France. Servo device for controlling flow in a hydraulic installation, particularly for the assisted steering of a vehicle. 4,672,885, Cl. 91-450.000.

Kettlitz, Karsten K.: *See—*
Schlueter, Gary R.; Kettlitz, Karsten K.; and Arnone, Louis F., III, 4,672,718, Cl. 24-90.00A.

KevKel, Inc.: *See—*
Kronz, Kevin W., 4,673,118, Cl. 224-259.000.

Keycon Hardware Products, Inc.: *See—*
Craig, Clark E., 4,672,827, Cl. 70-367.000.

Keyser, John J.: *See—*
Eaton, Richard G.; and Keyser, John J., 4,674,110, Cl. 378-208.000.

Kiamil, Sinan B.: *See—*
Potter, William D.; Kiamil, Sinan B.; and White, Nicholas D., 4,672,956, Cl. 128-90.000.

Kiilunen, Matt, to Weld Mold Company. Arc welding electrode. 4,673,796, Cl. 219-145.220.

Kikuchi, Akiyoshi: *See—*
Shin, Shigeo; Takatsu, Tamao; Saito, Teiichiro; Kikuchi, Akiyoshi; and Nakanishi, Tsuneo, 4,673,123, Cl. 228-263.130.

Kikuchi, Masafumi; and Sakamoto, Hiroshi, to Sony Corporation. Multiple scanning type television receiver. 4,673,984, Cl. 358-190.000.

Kikuchi, Naomi. Wind electric generator. 4,673,822, Cl. 290-44.000.

Kim, Chong Y.: *See—*
Brothers, Charles E.; and Kim, Chong Y., 4,673,647, Cl. 435-189.000.

Kim, Jeong R. Swimming apparatus. 4,673,364, Cl. 441-59.000.

Kim, Kyunghoon: *See—*
Ramalingam, Subbiah; Qi, Cai B.; and Kim, Kyunghoon, 4,673,477, Cl. 204-192.380.

Kimberly-Clark Corporation: *See—*
Lassen, Frederich O.; Sherrod, Earle H.; Nichols, Ann M.; and Serbiak, Paul J., 4,673,403, Cl. 604-385.00R.

Kimura, Kunio: *See—*
Endoh, Seiji; Kimura, Kunio; Ohta, Toshihiko; and Kato, Yasuo, 4,673,724, Cl. 528-206.000.

Kimura, Tomoaki: *See—*
Nakato, Hakaru; Nozaki, Tsutomu; Kinoshita, Katsuo; Habu, Yasuhiro; Ohnuma, Hiroaki; Ohmiya, Shigeru; and Kimura, Tomoaki, 4,673,024, Cl. 164-431.000.

Kincheloe, David W.; and Clark, Richard L., to American Multimedia, Inc. Method and apparatus for increasing density of an accumulation of tape in a closed loop tape transporter. 4,673,992, Cl. 360-15.000.

Kinoshita, Katsuo: *See—*
Nakato, Hakaru; Nozaki, Tsutomu; Kinoshita, Katsuo; Habu, Yasuhiro; Ohnuma, Hiroaki; Ohmiya, Shigeru; and Kimura, Tomoaki, 4,673,024, Cl. 164-431.000.

Kinser, Robert E. Cheese cutter apparatus. 4,672,873, Cl. 83-200.100.

Kinslow, Joseph C.: *See—*
Meyer, Bernard H.; DiGiulio, Adolph V.; Kinslow, Joseph C.; and Hajnik, Dennis M., 4,673,694, Cl. 521-59.000.

Kinugawa, Ryoji: *See—*
Oyama, Minoru; and Kinugawa, Ryoji, 4,674,008, Cl. 361-417.000.

Kioka, Mamoru; and Kashiwa, Norio, to Mitsui Petrochemical Industries, Ltd. Process for producing olefin polymers and catalyst composition therefor. 4,673,719, Cl. 526-125.000.

Kishimoto, Shoji: *See—*
Matsuo, Taisuke, deceased; Ochiai, Michihiko; and Kishimoto, Shoji, 4,673,739, Cl. 540-355.000.

Kishimoto, Yasushi; and Masubuchi, Tetsuo, to Asahi Kasei Kogyo Kabushiki Kaisha. Olefin hydrogenation catalyst, process for hydrogenating polymers with the catalyst, and hydrogenated block copolymers produced by said processes. 4,673,714, Cl. 525-314.000.

Kiso, Yoshiaki; and Nakao, Kazuwa, to Shionogi & Co., Ltd. Polypeptide relating to α-hANP. 4,673,732, Cl. 530-326.000.

Kitahara, Makoto: *See—*
Katagiri, Kazuhara; Oguchi, Yoshihiro; Ohtake, Takeshi; Arao, Kozo; Kitahara, Makoto; and Takasu, Yoshio, 4,673,630, Cl. 430-72.000.

Kitamura, Hideaki: *See—*
Yamada, Mitsuhiko; and Kitamura, Hideaki, 4,673,989, Cl. 358-287.000.

Kitamura, Masatsugu; Tanaka, Mitsuaki; and Takekura, Hiroyuki, to Victor Company of Japan, Limited. Method and system for decoding a digital signal using a variable frequency low-pass filter. 4,673,916, Cl. 340-347.0SH.

Kitamura, Shigehiro: *See—*
Koshizuka, Kunihiro; Abe, Takao; Kitamura, Shigehiro; and Watanabe, Hiroshi, 4,673,618, Cl. 428-336.000.

Kitano, Kisei: *See—*
Sugimori, Shigeru; Ogawa, Tetsuya; Goto, Yasuyuki; Isoyama, Toyoshiro; Nigorikawa, Kazunori; Kitano, Kisei; Yoshida, Naoyuki; and Furukawa, Yoshito, 4,673,529, Cl. 252-299.630.

Kitano, Tateo: *See—*
Nishiyama, Yuji; Kitano, Tateo; and Hashimoto, Masakazu, 4,673,217, Cl. 297-473.000.

Kitaura, Wataru: *See—*
Ito, Tetsuo; Arita, Setsuo; and Kitaura, Wataru, 4,673,974, Cl. 358-108.000.

Kitto, William: *See—*
Haker, Leroy C.; and Kitto, William, 4,673,420, Cl. 55-179.000.

Kiuchi, Masayoshi: *See—*
Fukuda, Tsuyoshi; Suzuki, Masayuki; and Kiuchi, Masayoshi, 4,673,278, Cl. 354-479.000.

Kjellqvist, Olof G.; Akerblom, Bengt O.; and Sjobom, Axel H., to Sunds Defibrator Aktiebolag. Apparatus including contact free transfer of signals for measuring the gap between relatively rotating refiner discs. 4,673,875, Cl. 324-207.000.

Klauss, Heinrich; and Baarsch, Kurt, to Toschi Produktions-Gesellschaft mbH. Cooling tower panel from fiber concrete or similar material. 4,673,538, Cl. 261-112.000.

Klein, Gerhard: *See—*
Meier, Helmut-Martin; Dhein, Rolf; Winkel, Jens; Klein, Gerhard; and Kloker, Werner, 4,673,713, Cl. 525-278.000.

Kleinschrodt, Frank J.: *See—*
Subramanian, Mahadevan; Monday, Richard D.; Johnson, David B.; and Kleinschrodt, Frank J., 4,673,490, Cl. 208-354.000.

Kling, Bernard; Mongin, Roger; and Leguennec, Michel, to Commissariat a l'Energie Atomique. Optical connector, process for the production of said connector and fibre-fibre and diode-fibre connections obtained with this connector. 4,673,245, Cl. 350-96.200.

Kloeckner CRA Technologie GmbH: *See—*
Brotzmann, Karl; and Mantey, Paul-Gerhard, 4,673,167, Cl. 266-281.000.

Kloeckner-Humboldt-Deutz AG: *See—*
Wahnschaffe, Jurgen; Hartmann, Ernst-Siegfried; Casper, Karl-Josef; zur Nieden, Achim; and Schleiermacher, Herbert, 4,672,923, Cl. 123-41.740.

Kloker, Werner: *See—*
Meier, Helmut-Martin; Dhein, Rolf; Winkel, Jens; Klein, Gerhard; and Kloker, Werner, 4,673,713, Cl. 525-278.000.

Kluge, Hermann, to SWF Auto-Electric GmbH. Fuel supply pump. 4,673,333, Cl. 415-213.00T.

Kluss, Walter: *See—*
Sears, Jerome; Parfomak, Walter; and Kluss, Walter, 4,673,849, Cl. 318-272.000.

Knapp, Alfons, to Masco Corporation. Mixing valve. 4,672,999, Cl. 137-625.400.

Knapp, Johnn P., to Lear Siegler, Inc. Waste receptacle dumping apparatus. 4,673,327, Cl. 414-408.000.

Knight, David J., to Allied Corporation. Tractor air pressure braking system. 4,673,222, Cl. 303-9.000.

Knight, Rodney A.: *See—*
Ostreicher, Eugene A.; Knight, Rodney A.; Fiore, Joseph V.; Emond, George T.; and Hou, Kenneth C., 4,673,504, Cl. 210-500.220.

Ko, Hsi-Chia. Fixing cover of a walled faucet. 4,672,994, Cl. 137-359.000.

Kobayashi, Hiroo, to Canon Kabushiki Kaisha. Reduced vibration in a two part assembly for an image recording apparatus. 4,673,956, Cl. 346-160.000.

Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Kumagai, Naotake; and Tatemoto, Minoru, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Vehicle suspension apparatus. 4,673,193, Cl. 280-707.000.

Kobayashi, Kenichi: *See—*
Matsui, Showgo; and Kobayashi, Kenichi, 4,673,816, Cl. 250-556.000.

Kobayashi, Kohroh, to NEC Corporation. Bistable optical device. 4,674,100, Cl. 372-96.000.

Kobayashi, Ryuichi: *See—*
Suzuki, Masayuki; Ohara, Tsunemasa; Tosaka, Yoichi; Kobayashi, Ryuichi; Harada, Yoshihito; and Kawamura, Masaharu, 4,673,272, Cl. 354-173.110.

Kobayashi, Toshiyuki: *See—*
Akiyama, Tsutomu; and Kobayashi, Toshiyuki, 4,673,836, Cl. 310-239.000.

Kobayashi, Yuji; and Takahashi, Norio, to Dai Nippon Insatso Kabushiki Kaisha. Automatic range control method for an optical density/dot percentage measuring device. 4,673,807, Cl. 250-214.0AG.

Kobo, Kazuo; Morotomi, Noriaki; and Sato, Takeshi, to Matsushita Electric Industrial Co., Ltd. Digital data reproducing system. 4,673,979, Cl. 358-142.000.

Kobrehel, Michael D.: *See—*
Lam, Michael K.; Kazewych, Bohdan; and Kobrehel, Michael D., 4,672,771, Cl. 49-352.000.

Koch, Paul; and von Kunszberg, Eberhard, to Faudi Feinbau GmbH. Water separator and filter for liquid hydrogens. 4,673,499, Cl. 210-295.000.

Kocsis, Andre, to Halcyon Waterbed Inc. Polypropylene fiber baffle for waterbed mattress. 4,672,701, Cl. 5-450.000.

Kodama, Hitoshi: *See*—
Yoshizawa, Kenji; Komura, Hirotsugu; Kodama, Hitoshi; Ohnuki, Kazushi; Shoda, Isao; Magome, Kazuo; and Ito, Hiroshi, 4,673,846, Cl. 315-248.000.

Kodama, Satoru: *See*—
Hirai, Kazumi; Akiyoshi, Mitsuo; Nakano, Chikao; Watanabe, Kenji; and Kodama, Satoru, 4,673,800, Cl. 219-518.000.

Koepke, Gunther; Frenken, Hans; and Friedsam, Josef, to Agfa Gevaert Aktiengesellschaft. Process and apparatus for microwave melting solidified gel masses, in particular of photographic emulsions. 4,673,782, Cl. 219-10.55M.

Kogure, Tsuneo; Tsuchiyama, Yuji; Amano, Tadashi; Takahashi, Hideaki; Sekita, Katsuji; and Akami, Ichio, to Amada Company, Limited. Bending press. 4,672,831, Cl. 72-21.000.

Kohl, Albert: *See*—
Lehner, August; Heil, Guenter; Lenz, Werner; Balz, Werner; Kohl, Albert; and Schornick, Gunnar, 4,673,591, Cl. 427-48.000.

Kohmoto, Eiji: *See*—
Tsukamoto, Hidehiko; Kohmoto, Eiji; Asada, Koichi, deceased; Yamasaki, Masakuni; Matsumoto, Kenichi; Nakazono, Eiji; Wakamiya, Yoshinori; and Kuramoto, Satoru, 4,672,830, Cl. 72-8.000.

Kohno, Teruhisa; Nokubo, Seiji; and Matsuoka, Akio, to Sumitomo Electric Industries, Ltd. Brake pressure control valve assembly having a bypass function. 4,673,220, Cl. 303-6.00C.

Koichi Sakurai: *See*—
Kondo, Tatsuhei; Ito, Kaname; Ikeda, Shoichiro; Umeno, Masayoshi; and Ichikawa, Kenji, 4,673,391, Cl. 604-141.000.

Koie, Hiroshi: *See*—
Ogaki, Hirokazu; Funahashi, Yasuhiro; Koie, Hiroshi; and Kurachi, Tomoko, 4,674,055, Cl. 364-479.000.

Koike, Shigeyoshi: *See*—
Shirai, Kazunari; Kamioka, Hajime; and Koike, Shigeyoshi, 4,672,740, Cl. 29-590.000.

Kojima, Akinori, to Sanshin Kogyo Kabushiki Kaisha. Built-in tank containing lubricant or the like for outboard motors. 4,673,360, Cl. 440-88.000.

Kojima, Hirotaka: *See*—
Uchida, Teruyoshi; Yamamori, Hisayoshi; Kojima, Hirotaka; and Tashita, Junichi, 4,672,970, Cl. 128-635.000.

Kojima, Katsumi, to Nippon Air Brake Co., Ltd. Air dryer device. 4,673,419, Cl. 55-163.000.

Kokkinos, Angelos: *See*—
Santalla, Richard W.; Kokkinos, Angelos; Collette, Robert J.; and McCartney, Michael S., 4,672,900, Cl. 110-264.000.

Kolawole, Joshua O.: *See*—
Grieger, Ronald D.; Fariabi, Sepehr; and Kolawole, Joshua O., 4,673,842, Cl. 313-292.000.

Kolb, Werner, to Turbo-Luft-Technik GmbH. Axial blower. 4,673,331, Cl. 415-53.00R.

Kologiy, George J. Gutter cleaner. 4,673,129, Cl. 239-532.000.

Komatsu, Kazunori: *See*—
Kato, Mikihiko; Kato, Shinichi; Komatsu, Kazunori; and Komine, Shigeo, 4,672,913, Cl. 118-623.000.

Komatsu, Toshiyuki: *See*—
Inoue, Eiichi; Shimizu, Isamu; and Komatsu, Toshiyuki, 4,673,628, Cl. 430-58.000.

Komatsu, Yoshimi: *See*—
Matsuo, Kazuhiko; Hasegawa, Teruyuki; Kuwano, Seigo; Yamaguchi, Ryuji; Shiwata, Akio; Hamada, Yoneichi; Komatsu, Yoshimi; Kondo, Tsuneo; Shirotani, Yusuke; Nakashima, Hirohisa; and Matsuda, Yasuhiro, 4,674,101, Cl. 373-95.000.

Komine, Shigeo: *See*—
Kato, Mikihiko; Kato, Shinichi; Komatsu, Kazunori; and Komine, Shigeo, 4,672,913, Cl. 118-623.000.

Komiyama, Toru: *See*—
Yamashita, Hiroshi; Fujii, Kanenaga; Hayakawa, Junji; Komiyama, Toru; and Tamaru, Sinji, 4,673,243, Cl. 350-96.150.

Komura, Hirotsugu: *See*—
Yoshizawa, Kenji; Komura, Hirotsugu; Kodama, Hitoshi; Ohnuki, Kazushi; Shoda, Isao; Magome, Kazuo; and Ito, Hiroshi, 4,673,846, Cl. 315-248.000.

Konaka, Yukio: *See*—
Yamamoto, Hisashi; and Konaka, Yukio, 4,673,381, Cl. 493-128.000.

Kondo, Katsumi: *See*—
Yamazawa, Yasushi; Kondo, Katsumi; Tsutiya, Yasuhiro; Niimi, Takatsune; Yamamoto, Takashi; and Matsuba, Kunihiro, 4,673,451, Cl. 156-172.000.

Kondo, Tatsuhei; Ito, Kaname; Ikeda, Shoichiro; Umeno, Masayoshi; and Ichikawa, Kenji, to Koichi Sakurai. Non-contact controlled micropump. 4,673,391, Cl. 604-141.000.

Kondo, Tsuneo: *See*—
Matsuo, Kazuhiko; Hasegawa, Teruyuki; Kuwano, Seigo; Yamaguchi, Ryuji; Shiwata, Akio; Hamada, Yoneichi; Komatsu, Yoshimi; Kondo, Tsuneo; Shirotani, Yusuke; Nakashima, Hirohisa; and Matsuda, Yasuhiro, 4,674,101, Cl. 373-95.000.

Kondoh, Hisao: *See*—
Nishizawa, Jun-ichi; and Kondoh, Hisao, 4,673,961, Cl. 357-22.000.

Kondraske, George V.; and Shennib, Adnan, to Board of Regents, The University of Texas System. Character pattern recognition and communications apparatus. 4,674,112, Cl. 379-96.000.

Konersmann, Erhard, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Apparatus for measuring the vibrations of a spiral bevel gear drive on a gear testing machine. 4,672,850, Cl. 73-593.000.

Koni B. V.: *See*—
De Bruijn, Alexis M. R., 4,673,068, Cl. 188-315.000.

Konishi, Yoshinori: *See*—
Sadaki, Hiroshi; Narita, Hirokazu; Imaizumi, Hiroyuki; Konishi, Yoshinori; Inaba, Takihiro; Hirakawa, Tatsuo; Taki, Hideo; Tai, Masaru; Watanabe, Yasuo; and Saikawa, Isamu, 4,673,738, Cl. 540-222.000.

Konishiroku Photo Industry Co., Ltd.: *See*—
Koshizuka, Kunihiro; Abe, Takao; Kitamura, Shigehiro; and Watanabe, Hiroshi, 4,673,618, Cl. 428-336.000.
Yamazaki, Toshinori; Nakanishi, Tatsuo; Marukawa, Yuji; Takenouchi, Shigeki; and Nomori, Hiroyuki, 4,673,629, Cl. 430-58.000.

Konno, Masanori; Imai, Kiyoshi; and Dobashi, Toshihiro, to Amada Company, Limited. Method and apparatus for controlling an electric discharge machine. 4,673,791, Cl. 219-69.00M.

Kononen, Juhani, to Elevator GmbH. Brake in a light-constructed transport carriage. 4,673,066, Cl. 188-119.000.

Konz, Elmar; and Kaiser, Joachim, to Hoechst Aktiengesellschaft. Isoquinoline derivatives, pharmaceutical formulations based on these compounds and the use thereof. 4,673,682, Cl. 514-307.000.

Koppelomaki. Loudspeaker system. 4,673,056, Cl. 181-141.000.

Korf Engineering GmbH: *See*—
Hauk, Rolf, 4,673,432, Cl. 75-38.000.

Koshi, Isei: *See*—
Igarashi, Takeshi; Endo, Toshihiko; and Koshi, Isei, 4,673,636, Cl. 435-34.000.

Koshizuka, Kunihiro; Abe, Takao; Kitamura, Shigehiro; and Watanabe, Hiroshi, to Konishiroku Photo Industry Co., Ltd. Thermal recording medium. 4,673,618, Cl. 428-336.000.

Kosley, Raymond W., Jr.; and Cherill, Robert J., to Hoechst-Roussel Pharmaceuticals Inc. Aminoacyllabdanes. 4,673,752, Cl. 549-389.000.

Kotera, Masahide, to Canon Kabushiki Kaisha. Image signal processing apparatus. 4,674,126, Cl. 382-53.000.

Kotoh, Keigo, to Mitsubishi Denki Kabushiki Kaisha. Rescue transmitter apparatus. 4,673,936, Cl. 342-51.000.

Koyama, Ryouhei: *See*—
Katohno, Takashi; and Koyama, Ryouhei, 4,673,808, Cl. 250-231.0SE.

Kozak, Michael A., III, to San Diego Gas & Electric. Hydraulic swivel connector. 4,672,998, Cl. 137-614.040.

Kraft, Robert E.: *See*—
Dean, Arthur L.; Kraft, Robert E.; and Marshall, Kenneth M., 4,673,833, Cl. 310-29.000.

Kraftwerk Union Aktiengesellschaft: *See*—
Gugel, Georg; and Haas, Erich, 4,672,852, Cl. 73-622.000.

Krakkay, Tibor; Poggi, Tatjana; and Schubert, Ernst, to Hoechst Aktiengesellschaft. Polyacrylonitriles with a low K value. 4,673,721, Cl. 526-329.300.

Kramer, David M.: *See*—
Compton, Russell A.; Keller, John T.; McBride, Thomas R.; and Kramer, David M., 4,673,880, Cl. 324-309.000.

Krankkala, Paul L., to H. B. Fuller Company. Fast setting starch-based corrugating adhesive having partially hydrolized water soluble polyvinyl alcohol component. 4,673,698, Cl. 524-47.000.

Krautz, Alfons O.: *See*—
Richter, Georg-Gerd; and Krautz, Alfons O., 4,672,782, Cl. 52-218.000.

Krehan, Peter; and Oppelt, Werner, to General Motors Corporation. Resilient mount for telescopic struts. 4,673,192, Cl. 280-668.000.

Kremer, Wolfgang: *See*—
Meixner, Jurgen; Muller, Manfred; and Kremer, Wolfgang, 4,673,758, Cl. 560-90.000.

Kretschmer, Helmut; and Hochkoenig, Manfred, to Dr. Ing. h.c.F. Porsche Aktiengesellschaft. Motor vehicle with an air guidance device arranged in the body. 4,673,206, Cl. 296-1.00S.

Krishnan, Sivaram; and Grigo, Ulrich R., to Mobay Corporation. Flame retardant molding compositions. 4,673,699, Cl. 524-94.000.

Kristensen, Peter D.: *See*—
Hirsch, Michael; Kristensen, Peter D.; and Dunn, William W., 4,672,845, Cl.-73-151.000.

Krofta, Milos, to Lenox Institute For Research, Inc. Water treatment apparatus. 4,673,494, Cl. 210-202.000.

Kroll, Harry: *See*—
Morrissey, Ronald J.; and Kroll, Harry, 4,673,472, Cl. 204-44.600.

Kroll, Mark W., to Cherne Industries, Inc. Heart sound sensor. 4,672,976, Cl. 128-715.000.

Kroll, Mark W., to Cherne Industries, Inc. Lung sound cancellation method and apparatus. 4,672,977, Cl. 128-715.000.

Kronz, Kevin W., to KevKel, Inc. Ski carrying apparatus. 4,673,118, Cl. 224-259.000.

Krzyzek, Richard A.: *See*—
George, Henry J.; Krzyzek, Richard A.; Enquist, Lynn W.; and Watson, Roger J., 4,673,641, Cl. 435-68.000.

Ku, Walter H.: *See*—
Chao, Pane-Chane; and Ku, Walter H., 4,673,960, Cl. 357-22.000.

Kubo, Jun, to Nissan Motor Company, Limited. Automotive anti-skid brake control system with sampling input time data of wheel speed sensor signals. 4,674,049, Cl. 364-426.000.

Kubo, Jun, to Nissan Motor Company, Limited. Anti-skid brake control system for automotive vehicle. 4,674,050, Cl. 364-426.000.

Kubo, Seitoku: *See*—
Hosono, Chihiro; Hayakawa, Yoichi; Kubo, Seitoku; Taga, Yutaka; and Nakamura, Shinya, 4,673,072, Cl. 192-3.570.

Kubota, Teruo; and Tasaki, Takashi, to Yamato Denki Co., Ltd. Push-in terminal system. 4,673,232, Cl. 439-441.000.

Kucera, Henry, to Houghton Mifflin Company. Textual database system using skeletonization and phonetic replacement to retrieve words matching or similar to query words. 4,674,066, Cl. 364-900.000.

Kudla, David P.: *See*—
Licata, Joseph P.; and Kudla, David P., 4,672,709, Cl. 15-250.270.

Kuehnert, Egbert, to Hoechst Aktiengesellschaft. Cutting device with a heated cutting wire. 4,672,872, Cl. 83-171.000.

Kuga, Ryuichiro: *See*—
Nagaoka, Yoshitomi; Matsuda, Yoshiteru; Hirao, Yoshiaki; Kuga, Ryuichiro; and Asakura, Hiroyuki, 4,673,274, Cl. 354-403.000.

Kugler, Reinhard: *See*—
Bohnen, Peter; Prietzel, Gunter; and Kugler, Reinhard, 4,673,779, Cl. 200-146.00R.

Kugo, Masaru; Igarashi, Osamu; Katogi, Kozo; Ito, Hiroshi; and Nakamura, Mamoru, to Hitachi, Ltd.; and Hitachi Automotive Engineering Co., Ltd. Liquid crystal color display apparatus having fixed and variable color regions. 4,673,252, Cl. 350 V-339.00F.

Kulak, Mark A.: *See*—
Sullivan, Thomas E.; and Kulak, Mark A., 4,673,521, Cl. 252-79.300.

Kuller, Bengt L.: *See*—
Keene, John F.; Kuller, Bengt L.; and Kemmeter, Robert G., 4,673,142, Cl. 242-58.300.

Kumagai, Naotake: *See*—
Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Kumagai, Naotake; and Tatemoto, Minoru, 4,673,193, Cl. 280-707.000.

Kumasaka, Toru; Kamiji, Koichi; and Ohya, Toshikazu, to NEC Home Electronics Ltd.; and Honda Giken Kogyo Kabushiki Kaisha. Vehicle-mounted triggering device and method of preventing false malfunction alarms in such a triggering device. 4,673,912, Cl. 340-52.00R.

Kummer, Kenneth L. Method and apparatus for grinding multiple workpieces. 4,672,775, Cl. 51-5.00R.

Kuna, Wayne A.: *See*—
Baran, Patrick S.; Levin, Sandra A.; and Kuna, Wayne A., 4,673,181, Cl. 273-1.0GC.

Kunichika, Kenji; Kagawa, Yoshikatsu; Ohishi, Chikashi; Nakao, Sho; and Asao, Yasuzi, to Fuji Photo Film Co., Ltd. Electrophotographic lithographic printing plate. 4,673,627, Cl. 430-49.000.

Kuo, Samuel C., to GTE Government Systems Corporation. Foreshortened dipole antenna with triangular radiators. 4,673,948, Cl. 343-792.500.

Kurachi, Tomoko: *See*—
Ogaki, Hirokazu; Funahashi, Yasuhiro; Koie, Hiroshi; and Kurachi, Tomoko, 4,674,055, Cl. 364-479.000.

Kuramochi, Wataru: *See*—
Takeda, Mitsuru; and Kuramochi, Wataru, 4,673,626, Cl. 430-14.000.

Kuramoto, Satoru: *See*—
Tsukamoto, Hidehiko; Kohmoto, Eiji; Asada, Koichi, deceased; Yamasaki, Masakuni; Matsumoto, Kenichi; Nakazono, Euji; Wakamiya, Yoshinori; and Kuramoto, Satoru, 4,672,830, Cl. 72-8.000.

Kurashiki Boseki Kabushiki Kaisha: *See*—
Wada, Atsuki; Takahashi, Mikio; and Suhara, Eiji, 4,673,493, Cl. 210-98.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,673,669, Cl. 514-42.000.

Kuroda, Takao: *See*—
Shiraki, Yasuhiro; Katayama, Yoshifumi; Murayama, Yoshimasa; Morioka, Makoto; Sawada, Yasushi; Mishima, Tomoyoshi; Kuroda, Takao; and Maruyama, Eiichi, 4,673,959, Cl. 357-22.000.

Kurosawa, Akihito; and Anazawa, Osamu, to Sanden Corporation. Dispensing mechanism for vending machines. 4,673,105, Cl. 221-281.000.

Kurpie, Kenneth R.: *See*—
Ryntz, Rose A.; and Kurpie, Kenneth R., 4,673,718, Cl. 525-476.000.

Kurtgis, Michael P. Placement of load onto energized transmission line system. 4,673,059, Cl. 182-3.000.

Kushida, Takeo; and Yamada, Keiichi, to Diesel Kiki Co., Ltd. Electromagnetic actuators. 4,673,163, Cl. 251-129.100.

Kuwabara, Hidemitsu: *See*—
Hata, Ryosuke; Yamanouchi, Shosuke; Hirose, Masayuki; Kuwabara, Hidemitsu; Mizumoto, Yasuharu; and Hagiuda, Yasuhiro, 4,673,607, Cl. 428-172.000.

Kuwano, Seigo: *See*—
Matsuo, Kazuhiko; Hasegawa, Teruyuki; Kuwano, Seigo; Yamaguchi, Ryuji; Shiwata, Akio; Hamada, Yoneichi; Komatsu, Yoshimi; Kondo, Tsuneo; Shirotani, Yusuke; Nakashima, Hirohisa; and Matsuda, Yasuhiro, 4,674,101, Cl. 373-95.000.

Kuwata, Tamotsu; Suginaka, Yutaka; and Ohtomo, Hideo, to Meiji Milk Products Co., Ltd. Method of producing calcium-enriched aseptic soy bean curd. 4,673,583, Cl. 426-573.000.

Kvakovszky, George: *See*—
Coleman, James P.; Kvakovszky, George; and Sikora, David J., 4,673,508, Cl. 210-698.000.

Kwasuik, Hans-Jurgen; and Piduch, Hans-Gunter, to C. Otto & Comp. G.m.b.H. Method for extracting charging gases in coke oven chambers. 4,673,463, Cl. 201-41.000.

Kwikset Corporation: *See*—
Gater, Arnold C.; and Hu, Thomas S. S., 4,672,829, Cl. 70-472.000.

Kwong, Fat-Cho: *See*—
Ferguson, Harry D.; Lee, Kar-Kui; Oliver, William; Kwong, Fat-Cho; Young, Ronald; Hammell, Jim; Morrow, Keith; and Chaudhary, Rashid A., 4,673,920, Cl. 340-521.000.

Kyocera Corporation: *See*—
Morita, Keitoku, 4,673,821, Cl. 250-578.000.

Kyowa Hakko Kogyo Co., Ltd.: *See*—
Tomohiro, Susumu; Arai, Yuko; and Mineura, Kazuyuki, 4,673,645, Cl. 435-119.000.

Laapotti, Jorma, to Valmet Oy. Press section of a paper machine. 4,673,462, Cl. 162-301.000.

Labindustries, Inc.: *See*—
MacDermott, Bruce R., 4,672,857, Cl. 73-864.180.

LaBudde, Edward V.: *See*—
Hsieh, Der C.; and LaBudde, Edward V., 4,674,076, Cl. 369-32.000.

Lachmann, Helmut. High-pressure self-actuating flow-control valve assembly. 4,673,162, Cl. 251-30.010.

Lacz, Alexandre, to Bendix Electronics S.A. Multiple fastening clip and device for the collective mounting of electronic power components. 4,674,005, Cl. 361-388.000.

Ladic, Josef: *See*—
Munning, Hans; Bock, Jurgen; Oldach, Bernd; Ladic, Josef; Rauert, Max-Otto; Emde, Hugo; Petzsch, Dietrich; and de Baan, Johannes J., 4,673,067, Cl. 188-299.000.

Lagow, Richard J.: *See*—
Farris, Edward T.; Barsa, John J.; Lagow, Richard J.; and Capano, Paul J., 4,673,355, Cl. 433-218.000.

Laitram Corporation, The: *See*—
Lapeyre, James M.; and Greve, Christopher G., 4,673,011, Cl. 144-136.00B.

Lam, Michael K.; Kazewych, Bohdan; and Kobrehel, Michael D., to General Motors Corporation. Tape drive window regulator apparatus and method. 4,672,771, Cl. 49-352.000.

LaMattina, John L., to Pfizer Inc. Method for treatment of gastrointestinal disorders. 4,673,677, Cl. 514-272.000.

Lambertz, Horst: *See*—
Schwarze, Werner; Wolff, Siegfried; Remmel, Hans; and Lambertz, Horst, 4,673,741, Cl. 544-209.000.

Lambley, Stephen: *See*—
Docherty, Brian; and Lambley, Stephen, 4,672,759, Cl. 40-450.000.

Lamont, Lawrence T., Jr., to Varian Associates, Inc. Magnetically enhanced sputter source. 4,673,480, Cl. 204-298.000.

LaMont, Romanus M. Unitary collapsible coat hanger. 4,673,115, Cl. 223-94.000.

Lamping, Alfons; Karth, Beat; and Hiltbrunner, Werner, to Nyffeler, Corti AG. Cold- or heat-sealable composite film for reclosable packages. 4,673,601, Cl. 428-35.000.

Lamson, Frederick W.; Lansing, Richard; Decheim, Robert; and Martin, William, to Lockwood Manufacturing Company. Multi-level rack assembly. 4,673,092, Cl. 211-188.000.

Landine, Robert C.: *See*—
De Garie, Claude; Cocci, Albert; and Landine, Robert C., 4,672,691, Cl. 4-499.000.

Landis, Donald; and Fabricius, John H., to BTU Engineering Corporation. Modular, self-diagnostic mass-flow controller and system. 4,672,997, Cl. 137-554.000.

Landis, Richard C., to ITT Corporation. Micro-coaxial substrate. 4,673,904, Cl. 333-238.000.

Lang, Robert J.: *See*—
Salzman, Joseph; Lang, Robert J.; and Yariv, Amnon, 4,674,096, Cl. 372-50.000.

Lange, Frederick R.; and Rosenbaum, Walter S., to International Business Machines Corporation. System for detecting and correcting contextual errors in a text processing system. 4,674,065, Cl. 364-900.000.

Langen, Bernardus G.: *See*—
Terlizzi, Frank M., Jr.; and Langen, Bernardus G., 4,672,793, Cl. 53-434.000.

Langenhein, William J., Jr.: *See*—
Hudson, Alan T.; Gagnon, David P.; Johns, David W., II; and Langenhein, William J., Jr., 4,673,363, Cl. 441-1.000.

Langowski, Emil J., to Emerson Electric Co. Nut/clutch for linear actuator power screw. 4,672,858, Cl. 74-424.80R.

Lansing, Richard: *See*—
Lamson, Frederick W.; Lansing, Richard; Decheim, Robert; and Martin, William, 4,673,092, Cl. 211-188.000.

Lanzer, Heribert, to Steyr-Daimler-Puch AG. Drive system for automobiles having two driven axles. 4,672,861, Cl. 74-665.0GE.

Lapeyre, James M.; and Greve, Christopher G., to Laitram Corporation, The. Staircase stringer fabricating apparatus. 4,673,011, Cl. 144-136.00B.

Lappe, Peter: *See*—
Bahrmann, Helmut; Cornils, Boy; Lipps, Wolfgang; Lappe, Peter; and Springer, Helmut, 4,673,535, Cl. 260-501.150.

Larkin, Francis; and Amey, Jeffrey, to Brandt, Inc. Method and apparatus for counting currency and for confirming the count of strap currency. 4,674,060, Cl. 364-567.000.

Larnaston Limited: *See*—
Smale, Geoffrey A., 4,672,907, Cl. 114-103.000.

LaRou, Albert M., to Emerson Electric Co. Double row cylindrical expansion bearing. 4,673,302, Cl. 384-548.000.

Lassen, Frederich O.; Sherrod, Earle H.; Nichols, Ann M.; and Serbiak, Paul J., to Kimberly-Clark Corporation. Method and pad allowing improved placement of catamenial device. 4,673,403, Cl. 604-385.00R.

Laurent, Henry; and Wiechert, Rudolf, to Schering Aktiengesellschaft. 17α-alkyl-17β-hydroxy-1α-methyl-4-androsten-3-ones, their production and use pharmaceutically. 4,673,673, Cl. 514-178.000.
Lauzier, Rene, to Etablissements Lauzier. Adjustable mount for roller-type awning. 4,673,017, Cl. 160-22.000.
Lavens, Thomas R.; Corrigan, Francis R.; Shott, Richard L.; and Bovenkerk, Harold P., to General Electric Company. Re-sintered boron-rich polycrystalline cubic boron nitride and method for making same. 4,673,414, Cl. 51-293.000.
LEA Manufacturing Company, The: *See*—
Tuttle, James N., Jr.; and Jaboin, Olyn P., 4,673,445, Cl. 148-6.15R.
Lear, Anthony: *See*—
Maytum, Michael J.; and Lear, Anthony, 4,673,844, Cl. 315-200.00R.
Lear Siegler, Inc.: *See*—
Knapp, Johnn P., 4,673,327, Cl. 414-408.000.
Leary, David F.; and Brigham, Alan, to Raychem Corporation. PTC heater assembly. 4,673,801, Cl. 219-544.000.
LeBaron, Francis, to E.L. LeBaron Foundry Co. Method of and apparatus for adjustably leveling manhole covers, grates and the like. 4,673,310, Cl. 404-26.000.
Le Berre, Serge: *See*—
Hehlen, Robert; Hareng, Michel; Le Berre, Serge; and Mourey, Bruno, 4,673,256, Cl. 350-350.00S.
Leblanc, Andre: *See*—
Tam, Le Dinh C.; Garceau, Roger; and Leblanc, Andre, 4,673,982, Cl. 358-167.000.
LeBlond, Henri; and Cabot, Louis, to Badin Crouzet Aerodrom de Toussus-le-Noble. Multi-function pressure probe for aircraft. 4,672,846, Cl. 73-180.000.
Leblond, Henri: *See*—
Gohin, Christian; and Leblond, Henri, 4,672,848, Cl. 73-505.000.
Le-Carpentier, Alex; and Davis, Brian. Device for displaying artwork. 4,672,758, Cl. 40-152.100.
Ledley, Robert S., to National Biomedical Research Foundation. Split-image, multi-power microscopic image display system and method. 4,673,973, Cl. 358-93.000.
Lee, Albert C., to General Electric Company. Transformer with amorphous alloy core having chip containment means. 4,673,907, Cl. 336-92.000.
Lee, Arnold St. J. Method and apparatus for "zeroing" and calibrating a catheter-tip gauge-pressure transducer. 4,672,974, Cl. 128-673.000.
Lee, Ho-Lun: *See*—
Liu, Kang-Jen; and Lee, Ho-Lun, 4,673,454, Cl. 156-281.000.
Lee, Jeen-Ju. Cleaning device for the magnetic heads of video tape recorders. 4,674,000, Cl. 360-128.000.
Lee, Kar-Kui: *See*—
Ferguson, Harry D.; Lee, Kar-Kui; Oliver, William; Kwong, Fat-Cho; Young, Ronald; Hammell, Jim; Morrow, Keith; and Chaudhary, Rashid A., 4,673,920, Cl. 340-521.000.
Lee, Ki-Chang. Keyless automobile door lock/unlock, ignition switching and burglar alarm system. 4,673,914, Cl. 340-64.000.
Lee, Mark L.: *See*—
Houlihan, William J.; and Lee, Mark L., 4,673,672, Cl. 514-95.000.
Lee, Ming-Kwang, to Industrial Technology Research Institute. Polycrystalline silicon resistor having limited lateral diffusion. 4,673,531, Cl. 252-512.000.
Lefevre, Daniel: *See*—
Anzola, Michel; Lefevre, Daniel; Massicot, Patrick; Pierre, Jacques; and Henry, Antoine, 4,673,585, Cl. 427-6.000.
Legrand: *See*—
Badouard, Michel; Durame, Claude; and Pade, Bernard, 4,673,085, Cl. 206-459.000.
Leguennec, Michel: *See*—
Kling, Bernard; Mongin, Roger; and Leguennec, Michel, 4,673,245, Cl. 350-96.200.
Lehner, August; Heil, Guenter; Lenz, Werner; Balz, Werner; Kohl, Albert; and Schornick, Gunnar, to BASF Aktiengesellschaft. Production of layer-type magnetic recording media. 4,673,591, Cl. 427-48.000.
Lehoczky, Kalman N.: *See*—
Hohnstein, Dean H.; Jandovitz, John S.; and Lehoczky, Kalman N., 4,673,835, Cl. 310-217.000.
Leineweber, Michael: *See*—
Puhler, Alfred; Wolleben, Wolfgang; and Leineweber, Michael, 4,673,642, Cl. 435-91.000.
Leland Stanford Junior University, The Board of Trustees of the: *See*—
Gardner, Donald S.; Saraswat, Krishna C.; and Barbee, Troy W., Jr., 4,673,623, Cl. 428-620.000.
Le Marchand, Claude: *See*—
Gerard, Jean-Louis; and Le Marchand, Claude, 4,673,065, Cl. 188-73.380.
Lemmens, Pierre L.: *See*—
Schwickert, Manfred J.; and Lemmens, Pierre L., 4,673,421, Cl. 55-238.000.
Lemon, Chester L.; and Kelly, Bill A., to Appleton, James K. Method and apparatus for controlling the distribution of coupons. 4,674,041, Cl. 364-401.000.
Lenox Institute For Research, Inc.: *See*—
Krofta, Milos, 4,673,494, Cl. 210-202.000.
Lenox, Jerril C.; and Solis, Jesse. Headwear with built-in cooling means. 4,672,968, Cl. 128-380.000.
Lenz, Werner: *See*—
Lehner, August; Heil, Guenter; Lenz, Werner; Balz, Werner; Kohl, Albert; and Schornick, Gunnar, 4,673,591, Cl. 427-48.000.
Leonhard, Rolf; and Dettling, Hubert, to Robert Bosch GmbH. Apparatus for the removal of combustible solid particles from the exhaust gases of internal combustion engines. 4,672,808, Cl. 60-286.000.
Lessard, William W.: *See*—
Levene, Martin M.; and Lessard, William W., 4,672,870, Cl. 83-19.000.
Lester, William M.: *See*—
Towns, Edward J.; Brown, Edward M.; and Lester, William M., 4,673,096, Cl. 215-230.000.
Leu, Frederick R.: *See*—
Grote, Warren; and Leu, Frederick R., 4,673,149, Cl. 248-343.000.
Leuthi, Rudolf: *See*—
Herb, Armin; Huegel, Robert; and Leuthi, Rudolf, 4,673,321, Cl. 411-40.000.
Levene, Martin M.; and Lessard, William W., to Ontario Die Company Limited. Vacuum die cutting apparatus for foam backed materials. 4,672,870, Cl. 83-19.000.
Levin, Sandra A.: *See*—
Baran, Patrick S.; Levin, Sandra A.; and Kuna, Wayne A., 4,673,181, Cl. 273-1.0GC.
Levrai, Roland: *See*—
Carre, Jean-Jacques; and Levrai, Roland, 4,673,223, Cl. 303-24.00C.
Lewandowski, Raymond F.; Doros, Jacek P.; and Redfield, William H., to Cherry Corporation, The. Snap action switch. 4,673,778, Cl. 200-67.00B.
Lewiner, Jacques; Charpak, Georges; and Pollak, Elie. Devices for reading the quantities of electrical charges borne by a dielectric. 4,673,885, Cl. 324-457.000.
Lewis, Milton R., to Icore International, Inc. Connector/adapter assembly for flexible conduit or electrical cable. 4,673,234, Cl. 439-469.000.
LGZ Landis: *See*—
Popovic, Radivoje; Solt, Katalin; and Berchier, Jean-Luc, 4,673,964, Cl. 357-27.000.
Li, Allen S.; Eccles, Richard M.; and Ruef, Lloyd M., to Hydrocarbon Research, Inc. Downwardly directed fluid flow distribution system for ebullated bed reactor. 4,673,552, Cl. 422-140.000.
Li, George S.: *See*—
Percec, Elena S.; and Li, George S., 4,673,717, Cl. 525-390.000.
Li, Hung J.; and McFall, John D., to Westinghouse Electric Corp. Directional comparison blocking system. 4,674,002, Cl. 361-66.000.
Licata, Joseph P.; and Kudla, David P., to General Motors Corporation. Windshield wiper drive. 4,672,709, Cl. 15-250.270.
Liescheidt, Duane B.: *See*—
Swiatlowski, George J.; Trapp, Donald P.; Liescheidt, Duane B.; McDaniel, Arden G.; and Brandt, Maurice W., 4,673,078, Cl. 198-450.000.
Liet, Cornelis H. Apparatus for bending sheet material. 4,672,835, Cl. 72-389.000.
Lindbloom, Bruce J.; Mathews, Peter; and Yam, David S., to Dicomed Corporation. Method and apparatus for flexigon representation of a two dimensional figure. 4,674,058, Cl. 364-518.000.
Linxwiler, Kenneth E.: *See*—
Spencer, John E.; Borel, Richard A.; Linxwiler, Kenneth E.; and Hoff, Andrew M., 4,673,456, Cl. 156-345.000.
Lipp, Ellis P.: *See*—
Smith, John W.; and Lipp, Ellis P., 4,673,239, Cl. 439-746.000.
Lippman, Andrew B.; Bove, Victor M., Jr.; and Wiesner, Jerome B., to Massachusetts Institute of Technology. Unrecordable video signals. 4,673,981, Cl. 358-160.000.
Lipps, Wolfgang: *See*—
Bahrmann, Helmut; Cornils, Boy; Lipps, Wolfgang; Lappe, Peter; and Springer, Helmut, 4,673,535, Cl. 260-501.150.
Lisak, Stephen P.: *See*—
Ryder, Francis E.; and Lisak, Stephen P., 4,674,018, Cl. 362-424.000.
Lisle Corporation: *See*—
Rodriguez, Saulo, 4,672,867, Cl. 81-176.100.
Lister-James, John: *See*—
Davison, Alan; Brenner, David; Lister-James, John; and Jones, Alun G., 4,673,562, Cl. 424-1.100.
Liu, Dean-Yuan; and Sholtis, Albert A., to Sanders Associates, Inc. Thermal printer ribbon cartridge for wide ribbons. 4,673,304, Cl. 400-208.000.
Liu, Kang-Jen; and Lee, Ho-Lun, to Chinese Petroleum Corp. Process for preparing bipolar membranes. 4,673,454, Cl. 156-281.000.
Lockheed Corporation: *See*—
Caughman, Donald O.; and Plumley, Wallace J., 4,674,057, Cl. 364-513.000.
Lockwood, David N. Building panels. 4,672,780, Cl. 52-82.000.
Lockwood Manufacturing Company: *See*—
Lamson, Frederick W.; Lansing, Richard; Decheim, Robert; and Martin, William, 4,673,092, Cl. 211-188.000.
Loctite Corporation: *See*—
Beers, M. Dale; and Thompson, James E., 4,673,750, Cl. 549-215.000.
Lodge, Robert H.: *See*—
Phillips, Ian R.; Lodge, Robert H.; and Bunyan, Glen W., 4,673,387, Cl. 604-62.000.
Lofgren, Barbro U.; Luciani, Luciano; Seppanen, Hanneli; Stjernberg, Maria H.; and Iiskola, Eero I., to Neste Oy. Catalyst components, a catalyst and a process for the polymerization of olefins. 4,673,661, Cl. 502-111.000.
Logan, Maurus C.; and Sladen, Francis, to Thomas & Betts Corporation. Movable closure for optical elements. 4,673,242, Cl. 350-96.200.

Lonseal Corporation: *See*—
Shoji, Toru; Sugiyama, Mitsuru; Takezawa, Makoto; Akiba, Yuichi; Kaneko, Akira; and Sato, Mituo, 4,673,596, Cl. 427-262.000.

Looschen, Floyd W., to Xerox Corporation. Variable threshold scan detector utilizing crossover points on photodetectors of the laser beam to monitor the threshold. 4,673,811, Cl. 250-235.000.

Lopic, Franz: *See*—
Prestele, Erich; Schneider, Alfred; Hepperle, Willi; Katzer, Johann; Stephany, Christian; and Lopic, Franz, 4,673,307, Cl. 401-289.000.

L'Oreal: *See*—
Grollier, Jean F.; Dubief, Claude; and Cauwet, Daniele, 4,673,568, Cl. 424-47.000.

Lorenz, Otto: *See*—
Zerle, Ludwig; Brunner, Gerhard; and Lorenz, Otto, 4,673,803, Cl. 235-436.000.

Lorenzetti, Theodore V., to Corflex, Inc. Fastening apparatus. 4,672,720, Cl. 24-163.00R.

Lori Corporation: *See*—
Theriault, Kenneth T., 4,672,828, Cl. 70-373.000.

Losapio, Peter F.: *See*—
Germer, Warren R.; and Losapio, Peter F., 4,673,872, Cl. 324-103.00R.

Louie, Chuen W.; Roelofs, Darrell D.; Volk, John L.; and Romeo, Arthur L., to Hazeltine Corporation. Color monitor with improved digital convergence. 4,673,847, Cl. 315-368.000.

Lovable Industriale S.p.A.: *See*—
Bartolini, Dario, 4,673,448, Cl. 156-73.100.

Lubenow, Josef K.: *See*—
Wong, Did-Bun; and Lubenow, Josef K., 4,674,052, Cl. 364-466.000.

Lubrizol Corporation, The: *See*—
Stoldt, Stephen H.; and Walsh, Reed H., 4,673,412, Cl. 44-68.000.

Luciani, Luciano: *See*—
Lofgren, Barbro U.; Luciani, Luciano; Seppanen, Hanneli; Stjernberg, Maria H.; and Iiskola, Eero I., 4,673,661, Cl. 502-111.000.

Luckner, Joachim: *See*—
Bartko, Kristine; Gabler, Dieter; Heinrich, Peter; Luckner, Joachim; and Schlenkrich, Bernd, 4,672,833, Cl. 72-111.000.

Ludewig, Fritz: *See*—
Januch, Alois; Lugscheider, Walter; and Ludewig, Fritz, 4,673,510, Cl. 210-712.000.

Lugscheider, Walter: *See*—
Januch, Alois; Lugscheider, Walter; and Ludewig, Fritz, 4,673,510, Cl. 210-712.000.

Luiset, Jean-Jacques; and Seigneurin, Michel, to Micro-Mega S.A. Contra-angle for dental handpiece. 4,673,351, Cl. 433-29.000.

Lundin, Lars, to Oy Lars Lundin Patent Ab. Oil-spill-combatting water craft. 4,673,497, Cl. 210-242.300.

Lupoli, Peter J.: *See*—
Westover, Brooke N.; Lupoli, Peter J.; and Comerford, John J., 4,673,238, Cl. 439-890.000.

Lutz, Erno B. Illuminated fish attraction device. 4,672,765, Cl. 43-17.500.

Lynch, Gary M. Building structures. 4,672,889, Cl. 98-42.200.

Lynn, Kenneth M.; and Rollins, Richard, to Baxter Travenol Laboratories, Inc. Splash back reduction drip chamber. 4,673,397, Cl. 604-251.000.

M.A.G. Engineering & Mfg. Co., Inc.: *See*—
Allenbaugh, Howard M., 4,673,204, Cl. 292-346.000.

Mabe, Atsushi; and Negishi, Masami, to Sanden Corporation. Variable capacity scroll type fluid compressor. 4,673,340, Cl. 418-15.000.

MacBain, Ronald H., to Mattell, Inc. Animated figure toy. 4,673,367, Cl. 446-4.000.

MacDermott, Bruce R., to Labindustries, Inc. Liquid microdispenser. 4,672,857, Cl. 73-864.180.

MacDougall, Ellis C. Security fence. 4,673,166, Cl. 256-11.000.

Machart, Beverly H.: *See*—
Hernandez, Irene H.; Barker, Barbara A.; Himelstein, Carol S.; and Machart, Beverly H., 4,674,042, Cl. 364-401.000.
Hernandez, Irene H.; Barker, Barbara A.; Himelstein, Carol S.; and Machart, Beverly H., 4,674,043, Cl. 364-401.000.

Machine Technology, Inc.: *See*—
Spencer, John E.; Borel, Richard A.; Linxwiler, Kenneth E.; and Hoff, Andrew M., 4,673,456, Cl. 156-345.000.

Machuron, Robert, to Ronic S.A. Speed control circuit for AC motor. 4,673,860, Cl. 318-812.000.

Mack Trucks, Inc.: *See*—
Yumlu, Salih V., 4,673,423, Cl. 55-319.000.

Maeda, Makoto: *See*—
Abe, Fumio; Hasegawa, Hiroshi; Fujita, Tadashi; and Maeda, Makoto, 4,673,349, Cl. 431-328.000.

Magee, C. Scott: *See*—
Shero, David J.; Dadpey, Habib; and Magee, C. Scott, 4,673,859, Cl. 318-810.000.

Magnier, Claude, to Rhone-Poulenc Specialites Chimiques. Catalyst support and process for preparing same. 4,673,663, Cl. 502-320.000.

Magome, Kazuo: *See*—
Yoshizawa, Kenji; Komura, Hirotsugu; Kodama, Hitoshi; Ohnuki, Kazushi; Shoda, Isao; Magome, Kazuo; and Ito, Hiroshi, 4,673,846, Cl. 315-248.000.

Mahawili, Imad, to Focus Semiconductor Systems, Inc. Fluidized bed heater for semiconductor processing. 4,673,799, Cl. 219-399.000.

Maher, Timothy J.: *See*—
Wurtman, Richard J.; and Maher, Timothy J., 4,673,689, Cl. 514-561.000.

Mahieu, Claude; and Papantoniou, Christos, to Societe Anonyme dite: L'Oreal. Cosmetic compositions for hair and skin which contain a methacrylic or acrylic acid copolymer, an alkyl acrylate and/or methacrylate and an allyl derivative. 4,673,571, Cl. 424-70.000.

Maiwald, Dietrich G.: *See*—
Chevillat, Pierre R.; Maiwald, Dietrich G.; and Ungerboeck, Gottfried, 4,674,103, Cl. 375-13.000.

Makiura, Yoshinori: *See*—
Hisajima, Masahiko; Shigemura, Yutaka; Makiura, Yoshinori; and Ishito, Mitsuya, 4,673,283, Cl. 355-14.0SH.

Malamed, Josef, to JMW Textiles. Single tape closure construction. 4,672,722, Cl. 24-446.000.

Malinowski, Paul A.: *See*—
Brelsford, David P.; Cerutti, Daniel D.; Coleman, Leslie S.; Davison, Gerald A.; Dewey, Pamela H.; Enichen, Margaret C.; Hartley, Sarah T.; Malinowski, Paul A.; Rogers, Roger W.; Tallman, Peter H.; and Czak, Lynn A., 4,674,038, Cl. 364-200.000.

Mallinckrodt, Inc.: *See*—
Buck, Keith T.; Boeing, Anthony J.; and Dolfini, Joseph E., 4,673,766, Cl. 568-433.000.

Mammarella, James J., Sr., to Paramount Packaging. Flexo-gravure printing. 4,672,893, Cl. 101-170.000.

Manabe, Takashi: *See*—
Ueda, Ikuo; Shiokawa, Youichi; and Manabe, Takashi, 4,673,676, Cl. 514-267.000.

Mancini, Donato. Ski storage rack. 4,673,088, Cl. 211-70.500.

Mandelkorn, Joseph. Glass sealed silicon membrane solar cell. 4,673,770, Cl. 136-259.000.

Mandle, Robert J., to Ionics Incorporated. Isoelectric focusing apparatus. 4,673,483, Cl. 204-301.000.

Mang, Paul: *See*—
Driller, Hubert; and Mang, Paul, 4,674,006, Cl. 361-393.000.

MANIA Electronik Automatisation Entwicklung und Geratebau GmbH: *See*—
Driller, Hubert; and Mang, Paul, 4,674,006, Cl. 361-393.000.

Mannesmann AG: *See*—
Babsch, Alfred; Beth, Dieter; Panzer, Werner; and Stempfle, Johann, 4,673,810, Cl. 250-231.0SE.

Mantey, Paul-Gerhard: *See*—
Brotzmann, Karl; and Mantey, Paul-Gerhard, 4,673,167, Cl. 266-281.000.

Manville Service Corporation: *See*—
Smith, William H., 4,673,594, Cl. 427-196.000.

Manzoni-Bouchot: *See*—
Manzoni, Stephane, 4,674,013, Cl. 362-66.000.

Manzoni, Stephane, to Manzoni-Bouchot. Device for adjusting the position of vehicle headlamps. 4,674,013, Cl. 362-66.000.

Marathon Oil Company: *See*—
Sydansk, Robert D., 4,673,040, Cl. 166-305.100.

Marconi Company Limited, The: *See*—
Newham, Paul, 4,673,947, Cl. 343-781.0CA.

Marcq, Bernard: *See*—
Delbecq, Gerard; Markey, Jean-Pierre; Marcq, Bernard; and Val, Rene , 4,672,726, Cl. 29-33.00A.

Marion, Bernard, to Sophysa. Valve for the treatment of hydrocephalus. 4,673,384, Cl. 604-10.000.

Markey, Jean-Pierre: *See*—
Delbecq, Gerard; Markey, Jean-Pierre; Marcq, Bernard; and Val, Rene , 4,672,726, Cl. 29-33.00A.

Markow, Edward G., to Grumman Aerospace Corporation. Run-flat tire incorporating tape-wrapped helical coil band and method of forming. 4,673,014, Cl. 152-156.000.

Markowitz, Richard: *See*—
Shernov, Stephen L.; Siegal, Maurice; and Markowitz, Richard, 4,673,569, Cl. 424-47.000.

Marley Tile AG: *See*—
Wood, John W. M.; and Hack, Richard C., 4,673,659, Cl. 106-98.000.

Marlow, John, to Holliday Amusement Company, Inc. of Charleston. Coin operated switch. 4,673,828, Cl. 307-139.000.

Marlowe, Christian P. Hydraulic transmission device and method of using it. 4,672,810, Cl. 60-332.000.

Marrs, Gevan R.; and Prieve, Kathryn A., to Weyerhaeuser Company. Sample splitter. 4,672,856, Cl. 73-863.520.

Marshall, David: *See*—
Hawe, Malcolm; Marshall, David; and Walker, John R., 4,673,520, Cl. 252-70.000.

Marshall, Kenneth M.: *See*—
Dean, Arthur L.; Kraft, Robert E.; and Marshall, Kenneth M., 4,673,833, Cl. 310-29.000.

Martin, Daniel L. Joint-replacement prosthetic device. 4,673,407, Cl. 623-20.000.

Martin, Ivan W. Aseptic connector assembly for conduits for sterile fluids. 4,673,400, Cl. 604-283.000.

Martin, Johannes J. E. Grate bar for use in industrial furnaces. 4,672,947, Cl. 126-163.00R.

Martin, William: *See*—
Lamson, Frederick W.; Lansing, Richard; Decheim, Robert; and Martin, William, 4,673,092, Cl. 211-188.000.

Martinelli, Robert M., to Keller-Mullett Technology. Transformer-coupled two-inductor buck converter. 4,674,019, Cl. 363-20.000.

Marukawa, Yuji: *See*—
Yamazaki, Toshinori; Nakanishi, Tatsuo; Marukawa, Yuji; Takenouchi, Shigeki; and Nomori, Hiroyuki, 4,673,629, Cl. 430-58.000.

Maruyama, Eiichi: *See*—
Shiraki, Yasuhiro; Katayama, Yoshifumi; Murayama, Yoshimasa; Morioka, Makoto; Sawada, Yasushi; Mishima, Tomoyoshi; Kuroda, Takao; and Maruyama, Eiichi, 4,673,959, Cl. 357-22.000.

Marvin Glass & Associates: *See*—
Baran, Patrick S.; Levin, Sandra A.; and Kuna, Wayne A., 4,673,181, Cl. 273-1.0GC.

Masaki, Seishi: *See*—
Obata, Keigo; Dohi, Nobuyasu; Okuhama, Yoshiaki; Masaki, Seishi; Okada, Yukiyoshi; and Yoshimoto, Masakazu, 4,673,470, Cl. 204-44.400.

Maschinenfabrik Rieter AG: *See*—
Bachinger, Peter; and Giancarlo, Mondini, 4,673,137, Cl. 242-55.100.

Masco Corporation: *See*—
Knapp, Alfons, 4,672,999, Cl. 137-625.400.

Mason, Graham: *See*—
Hunter, Ian; Mason, Graham; and Scorer, Michael, 4,673,298, Cl. 374-122.000.

Massachusetts Institute of Technology: *See*—
Davison, Alan; Brenner, David; Lister-James, John; and Jones, Alun G., 4,673,562, Cl. 424-1.100.
Lippman, Andrew B.; Bove, Victor M., Jr.; and Wiesner, Jerome B., 4,673,981, Cl. 358-160.000.
Wurtman, Richard J.; and Maher, Timothy J., 4,673,689, Cl. 514-561.000.

Masse, Gary M. J.; and Edmonds, Anthony C. F., to C-I-L Inc. Generation of sulphur trioxide from oleum using microwave energy. 4,673,560, Cl. 423-532.000.

Massicot, Patrick: *See*—
Anzola, Michel; Lefevre, Daniel; Massicot, Patrick; Pierre, Jacques; and Henry, Antoine, 4,673,585, Cl. 427-6.000.

Masson, James H., to United States of America, Air Force. Autonomous uninterruptable power supply apparatus. 4,673,826, Cl. 307-66.000.

Masubuchi, Tetsuo: *See*—
Kishimoto, Yasushi; and Masubuchi, Tetsuo, 4,673,714, Cl. 525-314.000.

Masuda, Shinji, to NEC Corporation. Constant voltage generator using memory transistors. 4,673,866, Cl. 323-313.000.

Masumoto, Hisayuki, to Minolta Camera Kabushiki Kaisha. Ultra compact zoom lens system. 4,673,258, Cl. 350-427.000.

Mathews, Peter: *See*—
Lindbloom, Bruce J.; Mathews, Peter; and Yam, David S., 4,674,058, Cl. 364-518.000.

Matsuba, Kunihiro: *See*—
Yamazawa, Yasushi; Kondo, Katsumi; Tsutiya, Yasuhiro; Niimi, Takatsune; Yamamoto, Takashi; and Matsuba, Kunihiro, 4,673,451, Cl. 156-172.000.

Matsuda, Kiyoshi: *See*—
Okamura, Masayoshi; Matsuda, Kiyoshi; Yamada, Hiromichi; Umeda, Hiromi; and Tomimoto, Masami, 4,673,655, Cl. 436-75.000.

Matsuda, Osamu; and Danno, Sadaji, to Ajinomoto General Foods, Inc. Process for producing coffee extract. 4,673,580, Cl. 426-385.000.

Matsuda, Yasuhiro: *See*—
Matsuo, Kazuhiko; Hasegawa, Teruyuki; Kuwano, Seigo; Yamaguchi, Ryuji; Shiwata, Akio; Hamada, Yoneichi; Komatsu, Yoshimi; Kondo, Tsuneo; Shirotani, Yusuke; Nakashima, Hirohisa; and Matsuda, Yasuhiro, 4,674,101, Cl. 373-95.000.

Matsuda, Yoshiteru: *See*—
Nagaoka, Yoshitomi; Matsuda, Yoshiteru; Hirao, Yoshiaki; Kuga, Ryuichiro; and Asakura, Hiroyuki, 4,673,274, Cl. 354-403.000.

Matsui, Kazuhiro: *See*—
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Matsui, Kenichi: *See*—
Akasaka, Tamotsu; Tomiuchi, Shinichi; Seto, Kazuo; Matsui, Kenichi; and Sawada, Yasushi, 4,673,543, Cl. 264-82.000.

Matsui, Showgo; and Kobayashi, Kenichi, to Fujitsu Limited. Method for inspecting a pattern and an apparatus for inspecting a pattern. 4,673,816, Cl. 250-556.000.

Matsumoto, Atsushi: *See*—
Suzuki, Tatsuo; and Matsumoto, Atsushi, 4,673,393, Cl. 604-167.000.

Matsumoto, Fuyuhiko; and Tsushima, Shuuichi, to Ricoh Company, Ltd. Cleaning device. 4,673,284, Cl. 355-15.000.

Matsumoto, Kenichi: *See*—
Tsukamoto, Hidehiko; Kohmoto, Eiji; Asada, Koichi, deceased; Yamasaki, Masakuni; Matsumoto, Kenichi; Nakazono, Euji; Wakamiya, Yoshinori; and Kuramoto, Satoru, 4,672,830, Cl. 72-8.000.

Matsumoto, Shuzo: *See*—
Ameyama, Minoru; Isayama, Takuro; Yamazaki, Hiroshi; Matsumoto, Shuzo; Katano, Yasuo; and Iwasaki, Kyuhachiro, 4,673,955, Cl. 346-140.00R.

Matsumoto, Tokikazu; Nakagawa, Yukio; and Uchiyama, Shinich, to Matsushita Electric Industrial Co., Ltd. Chrominance signal processing system. 4,673,970, Cl. 358-27.000.

Matsumura, Kiichiro; Takahashi, Akio; and Tsukamoto, Jun, to Director-General of Agency of Industrial Science and Technology. Electroconductive polymer and process for preparation thereof. 4,673,720, Cl. 526-285.000.

Matsunaga, Kenichi: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,673,669, Cl. 514-42.000.

Matsuno, Yutaka; Hatanaka, Yasunori; Shimizu, Hirokazu; Ishigaki, Masahiro; Harada, Hiroshi; Kawada, Michihiro; and Wakita, Yasukuni, to Toyota Jidosha Kabushiki Kaisha Toyo Tire & Rubber Co., Ltd. Boot with bracing boss portion for universal joint. 4,673,188, Cl. 277-212.0FB.

Matsuo, Kazuhiko; Hasegawa, Teruyuki; Kuwano, Seigo; Yamaguchi, Ryuji; Shiwata, Akio; Hamada, Yoneichi; Komatsu, Yoshimi; Kondo, Tsuneo; Shirotani, Yusuke; Nakashima, Hirohisa; and Matsuda, Yasuhiro, to Nippon Kokan Kabushiki Kaisha. Arc-heating type extra-furnace refining apparatus. 4,674,101, Cl. 373-95.000.

Matsuo, Michiko, heir: *See*—
Matsuo, Taisuke, deceased; Ochiai, Michihiko; and Kishimoto, Shoji, 4,673,739, Cl. 540-355.000.

Matsuo, Shuitsu: *See*—
Yamaguchi, Masayoshi; Meguro, Kazunori; Matsuo, Shuitsu; and Sasaki, Yasumi, 4,673,435, Cl. 75-235.000.

Matsuo, Taisuke, deceased (by Matsuo, Michiko, heir); Ochiai, Michihiko; and Kishimoto, Shoji, to Takeda Chemical Industries, Ltd. 4-carbamoyloxymethyl-1-sulfo-2-oxoazetidine derivatives and their production. 4,673,739, Cl. 540-355.000.

Matsuo, Yoshihiro: *See*—
Hara, Kunitaka; and Matsuo, Yoshihiro, 4,673,032, Cl. 165-44.000.

Matsuoka, Akio: *See*—
Kohno, Teruhisa; Nokubo, Seiji; and Matsuoka, Akio, 4,673,220, Cl. 303-6.00C.

Matsuoka, Shunji: *See*—
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Matsushita Electric Industrial Co. Ltd.: *See*—
Hirai, Kazumi; Akiyoshi, Mitsuo; Nakano, Chikao; Watanabe, Kenji; and Kodama, Satoru, 4,673,800, Cl. 219-518.000.
Kobo, Kazuo; Morotomi, Noriaki; and Sato, Takeshi, 4,673,979, Cl. 358-142.000.
Matsumoto, Tokikazu; Nakagawa, Yukio; and Uchiyama, Shinich, 4,673,970, Cl. 358-27.000.
Miyatake, Yoshito; and Wagamitsu, Yasuhiko, 4,673,841, Cl. 313-35.000.
Nagaoka, Yoshitomi; Matsuda, Yoshiteru; Hirao, Yoshiaki; Kuga, Ryuichiro; and Asakura, Hiroyuki, 4,673,274, Cl. 354-403.000.
Ogawa, Kazufumi, 4,673,474, Cl. 204-157.640.
Sakai, Hiroaki, 4,673,954, Cl. 346-139.00R.
Yoshida, Hideki; Shinohara, Koichi; and Suzuki, Takashi, 4,673,617, Cl. 428-323.000.

Matsushita Electric Works, Ltd.: *See*—
Akasaka, Tamotsu; Tomiuchi, Shinichi; Seto, Kazuo; Matsui, Kenichi; and Sawada, Yasushi, 4,673,543, Cl. 264-82.000.

Matsushita, Yoshiaki: *See*—
Furutera, Masaharu; Furukawa, Tetsuro; Matsushita, Yoshiaki; and Nakauchi, Kenji, 4,672,821, Cl. 62-324.200.

Matsuura, Yoshikazu, to Teraoka Seiko Company Limited. Control system for combined weighing apparatus. 4,673,046, Cl. 177-1.000.

Mattel Inc.: *See*—
Herring, Donald E.; and Wang, Lawrence C., 4,673,373, Cl. 446-378.000.
Kelley, William, 4,673,374, Cl. 446-383.000.

Mattell, Inc.: *See*—
MacBain, Ronald H., 4,673,367, Cl. 446-4.000.

Mattison, Robert N. Fishing jig and method of making same. 4,672,766, Cl. 43-17.600.

Mattson, Clyde E., to Kearney & Trecker Corporation. Rotary shuttle for machine tools. 4,673,076, Cl. 198-346.200.

Maudal, Inge, to General Dynamics, Pomona Division. Open-loop control system and method utilizing control function based on equivalent closed-loop linear control system. 4,674,029, Cl. 364-148.000.

Maudlin, Wendell E., to York International Corp. Universal motor control system. 4,673,850, Cl. 318-305.000.

Maurer, Robert J.: *See*—
Zafred, Paolo R.; Veronesi, Luciano; and Maurer, Robert J., 4,672,741, Cl. 29-726.000.

Maurer, Thomas; and Devrient, Ludwig, to GAO Gesellschaft fur Automation und Organisation mbH. Method of producing an identification card. 4,672,891, Cl. 101-32.000.

Mauvernay, Rolland-Yves: *See*—
Orsolini, Piero; Mauvernay, Rolland-Yves; and Deghenghi, Romano, 4,673,595, Cl. 427-213.320.

Max Rice Corporation, The: *See*—
Rice, Max, 4,673,180, Cl. 272-146.000.

May, Michael G., to Air, Ltd. Self-centering sealing for electrode structure. 4,673,455, Cl. 156-294.000.

May, Robert H.; and Burgoyne, Robert A., to Proflek, Inc. Mouthpiece. 4,672,959, Cl. 128-136.000.

Mayer, William J., to Russell, Don L.; and Russell, Donna J. Cycle seat. 4,673,212, Cl. 297-195.000.

Mayers, Theodore F. Dishwashing method. 4,673,441, Cl. 134-18.000.

Maytum, Michael J.; and Lear, Anthony, to Texas Instruments Incorporated. Starter circuit for a fluorescent tube lamp. 4,673,844, Cl. 315-200.00R.

Mazda Motor Corporation: *See*—
Akutagawa, Hitoshi, 4,673,377, Cl. 474-1.000.
Kanazawa, Hirotaka; Tanaka, Takeshi; Furutani, Shigeki; and Miyoshi, Akihiko, 4,673,189, Cl. 280-91.000.
Ueyama, Masato; Kanamaru, Takeshi; Shirai, Toshikazu; and Nakano, Kiyoshi, 4,673,075, Cl. 198-339.100.

Mazumder, Ali T.; and Fairey, Brian M., to NCR Corporation. Feed control apparatus. 4,673,141, Cl. 242-75.470.

McAnulty, John A., Sr., to Hughes Aircraft Company. Underwater electric cable tension termination. 4,673,231, Cl. 439-587.000.

McBride, Thomas R.: *See*—
Compton, Russell A.; Keller, John T.; McBride, Thomas R.; and Kramer, David M., 4,673,880, Cl. 324-309.000.

McCabe, Robert W.; and Mitchell, Patricia J., to General Motors Corporation. Method of simultaneous oxidation of carbon monoxide and unburned fuel in methanol vehicle exhaust. 4,673,556, Cl. 423-213.500.

McCartney, Charles P.; Susko, Edward W.; and Crouse, Joseph T., to General Motors Corporation. Battery and handle therefor. 4,673,625, Cl. 429-187.000.

McCartney, Michael S.: *See*—
Santalla, Richard W.; Kokkinos, Angelos; Collette, Robert J.; and McCartney, Michael S., 4,672,900, Cl. 110-264.000.

McCaskill, Rex A.: *See*—
Barker, Barbara A.; Hernandez, Irene H.; and McCaskill, Rex A., 4,674,040, Cl. 364-300.000.

McCaughey, Michael P. Method for synchronizing a tape recorder to a computer under program control. 4,673,993, Cl. 360-79.000.

McCormick, Gary D., to National Sanitary Laboratories, Inc. Multi-coin operated dispensing mechanism. 4,673,074, Cl. 194-236.000.

McCormick, Michael A.: *See*—
Brown, John D.; Gladdish, Peter; and McCormick, Michael A., 4,673,871, Cl. 324-76.00R.

McCullough, Doyle W. Enhanced circulation drill bit. 4,673,045, Cl. 175-339.000.

McCullough, Timothy J. Circular blade sharpening device. 4,672,776, Cl. 51-50.00R.

McDaniel, Arden G.: *See*—
Swiatlowski, George J.; Trapp, Donald P.; Liescheidt, Duane B.; McDaniel, Arden G.; and Brandt, Maurice W., 4,673,078, Cl. 198-450.000.

McDermott, Daniel J., to Westinghouse Electric Corp. System for charging containers with solids suspended in a carrier fluid. 4,673,008, Cl. 141-198.000.

McDonnell Douglas Corporation: *See*—
Barajas, Felix; and Bridges, Donald W., 4,673,532, Cl. 252-512.000.

McFall, John D.: *See*—
Li, Hung J.; and McFall, John D., 4,674,002, Cl. 361-66.000.

McGean-Rohco, Inc.: *See*—
Beach, Sidney C.; and Fellman, Jack D., 4,673,469, Cl. 204-38.400.

McGoldrick, Gilbert A.: *See*—
Jorgensen, George N.; McGoldrick, Gilbert A.; and Slicer, Allan E., 4,673,229, Cl. 439-207.000.

McGrath, Daniel A.: *See*—
Elmore, Carl L.; Sherman, Paul; and McGrath, Daniel A., 4,673,459, Cl. 159-13.100.

McKay, James B.: *See*—
Green, Michael J.; and McKay, James B., 4,674,087, Cl. 370-100.000.

McKinley, Jeanne: *See*—
Poret, Mark; and McKinley, Jeanne, 4,674,089, Cl. 371-25.000.

McLeod, Douglas D.: *See*—
Blamire, Michael F.; Briscoe, Peter F.; McLeod, Douglas D.; Doolittle, B. Kingsley; and Roach, Michael J., 4,673,900, Cl. 333-167.000.

McNiece, Raymond J.: *See*—
Minear, John W.; and McNiece, Raymond J., 4,673,033, Cl. 166-55.100.

McSherry, Thomas W.; and Garfield, Nathaniel H., to Mechanical Plastics Corp. Plastic fasteners. 4,673,150, Cl. 248-73.000.

McStravick, David M.; Chenoweth, David V.; and Anderson, David M., to Baker Oil Tools, Inc. Method of testing and reconditioning insulating tubular conduits. 4,673,652, Cl. 436-2.000.

Mechanical Plastics Corp.: *See*—
McSherry, Thomas W.; and Garfield, Nathaniel H., 4,673,150, Cl. 248-73.000.

Mednis, Juris M., to Universal Symetrics Corporation. Large stub spout bottles and mated combination unit. 4,673,094, Cl. 215-10.000.

Medri, Mario W.: *See*—
Becker, Amy J.; Bagan, James E.; and Medri, Mario W., 4,673,578, Cl. 426-93.000.

Megapulse, Inc.: *See*—
Ver Planck, Peter, 4,674,022, Cl. 363-57.000.

Meguro, Kazunori: *See*—
Yamaguchi, Masayoshi; Meguro, Kazunori; Matsuo, Shuitsu; and Sasaki, Yasumi, 4,673,435, Cl. 75-235.000.

Meier, Helmut-Martin; Dhein, Rolf; Winkel, Jens; Klein, Gerhard; and Kloker, Werner, to Bayer Aktiengesellschaft. Arylamine derivatives which can be incorporated as copolymerized units in unsaturated resins, the preparation of these derivatives and their use as curing accelerators. 4,673,713, Cl. 525-278.000.

Meiji Milk Products Co., Ltd.: *See*—
Kuwata, Tamotsu; Suginaka, Yutaka; and Ohtomo, Hideo, 4,673,583, Cl. 426-573.000.

Meiller, Hermann, to Grammer Sitzsysteme GmbH. Head support for a seat backrest. 4,673,214, Cl. 297-408.000.

Meixner, Jurgen; Muller, Manfred; and Kremer, Wolfgang, to Baker Aktiengesellschaft. Unsaturated polyesters. 4,673,758, Cl. 560-90.000.

Meland, Bruce C. Automatic thermostatic control system for heater and evaporative cooler. 4,673,028, Cl. 165-19.000.

Memminger, Gustav; and Roser, Erich, to Memminger, Gustav. Textile machinery yarn supply apparatus. 4,673,139, Cl. 242-47.010.

MER/I.C.B.: *See*—
Mombelli, Paul, 4,672,826, Cl. 70-278.000.

Mercer, David. Marine stern drive cover. 4,673,362, Cl. 440-112.000.

Merker, David E., to Babcock & Wilcox Company, The. Method and apparatus for tube expansion. 4,672,832, Cl. 72-62.000.

Merrick, Brian J.: *See*—
Webb, Stephen F.; and Merrick, Brian J., 4,673,449, Cl. 156-94.000.

Merrill Lynch, Pierce, Fenner & Smith, Inc.: *See*—
Kalmus, Leslie P.; Trojan, Donald R.; Mott, Bradley; and Strampfer, John, 4,674,044, Cl. 364-408.000.

Merritt, David T., to Otis Engineering Corporation. Side pocket mandrel. 4,673,036, Cl. 166-117.500.

Meskin, Alexander R.: *See*—
Bigelow, Louis K.; Grappendorf, Richard H.; and Meskin, Alexander R., 4,673,044, Cl. 175-329.000.

Meulendyk, John W.: *See*—
Vanderlaan, Robert D.; and Meulendyk, John W., 4,672,992, Cl. 137-331.000.

Meyer, Bernard H.; DiGiulio, Adolph V.; Kinslow, Joseph C.; and Hajnik, Dennis M., to Atlantic Richfield Company. Higher molecular weight thermoplastics having multimodal molecular weight distribution. 4,673,694, Cl. 521-59.000.

Meyer, Gunther: *See*—
Steffen, Klaus-Dieter; and Meyer, Gunther, 4,673,751, Cl. 549-294.000.

Meyer, Walter E., to Schenck Pegasus. Testing apparatus with improved follower mechanism. 4,672,844, Cl. 73-118.100.

Michael, Richard W., to Phillips Petroleum Company. Dielectric constant detector capacitance matching. 4,673,869, Cl. 324-61.00R.

Michaels, Sidney, to Clinton Industries, Inc. Pneumatically operated thread cutter. 4,672,902, Cl. 112-287.000.

Michaelson, Wayne A., to Unisys Corporation. High-performance pipelined stack with over-write protection. 4,674,032, Cl. 364-200.000.

Michas, Frederic. Test bench for the adjustment of electro-acoustic channels and particularly of devices for auditory correction. 4,674,123, Cl. 381-60.000.

Mickler, Paul W., to E-Vac, Inc. Vacuum extraction apparatus. 4,672,711, Cl. 15-306.00A.

Micrion Limited Partnership: *See*—
Guarino, Nicholas; Onorio, Gabriel; and Ward, Billy W., 4,673,101, Cl. 220-335.000.

Micro-Mega S.A.: *See*—
Luiset, Jean-Jacques; and Seigneurin, Michel, 4,673,351, Cl. 433-29.000.

Microscience Corporation: *See*—
Tragen, Barry J., 4,674,007, Cl. 361-404.000.

Mikami, Takashi: *See*—
Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, 4,673,692, Cl. 514-583.000.

Mikyska, Glenn E.: *See*—
Siczek, Roman W.; Stanley, William W.; and Mikyska, Glenn E., 4,673,297, Cl. 366-208.000.

Milburn Research Corporation: *See*—
Milburn, William W., Jr., 4,672,989, Cl. 137-1.000.

Milburn, William W., Jr., to Milburn Research Corporation. Flow conditioned nutation valving apparatus and method of operation. 4,672,989, Cl. 137-1.000.

Miles Laboratories, Inc.: *See*—
Brothers, Charles E.; and Kim, Chong Y., 4,673,647, Cl. 435-189.000.
Buckler, Robert T.; and Ward, Frederick E., 4,673,763, Cl. 564-155.000.
Grosch, Josephine; Wilson, Gary A.; Wollweber, Karen; and Yehle, Clifford O., 4,673,638, Cl. 435-34.000.
Wells, John R.; and Quirante, Carmelo G., 4,673,501, Cl. 210-406.000.

Miles, Ronald O., to Sachs/Freeman Associates, Inc. Method of aligning a polarization-preserving optical fiber with a semiconductor laser for attachment of the fiber to the laser. 4,673,244, Cl. 350-96.200.

Miller, Christopher G., to British Telecommunicstions public limited company. Multiprocessor system having a shared memory for enhanced interprocessor communication. 4,674,033, Cl. 364-200.000.

Miller, Gary T., to General Motors Corporation. Hydraulic radial piston pump intake porting arrangement. 4,673,337, Cl. 417-273.000.

Miller, George E., Jr., to Union Camp Corporation. Novel poly(ester-amide) compositions. 4,673,727, Cl. 528-295.500.

Miller, Jacob I.: *See*—
Sommer, Harold Z.; Owens, Omer O.; and Miller, Jacob I., 4,673,745, Cl. 546-147.000.

Miller, Roger L.: *See*—
Every, Peter; Atkins, Thomas M.; Miller, Roger L.; and Tribe, Leonard T., 4,673,226, Cl. 303-109.000.

Miller, Stephen J., to Chevron Research Company. Hydrogenation of a hydrocrackate using a hydrofinishing catalyst comprising palladium. 4,673,487, Cl. 208-58.000.

Millman, Irving: *See*—
Venkateswaran, Pinayur S.; Millman, Irving; and Blumberg, Baruch S., 4,673,575, Cl. 424-195.100.

Milton, Derek J., to Xerox Corporation. Transfer charge control system. 4,673,280, Cl. 355-3.0CH.

Mimori, Teruo: *See*—
Tsushima, Noburu; Fuse, Masashi; Mimori, Teruo; Sasaki, Toshio; and Mukai, Tadashi, 4,673,878, Cl. 324-226.000.

Minagawa, Motonobu; Nakahara, Yutaka; Shibata, Toshihiro; and Arata, Ryozo, to Adeka Argus Chemical Co., Ltd. Alkylidene bisphenol phosphites and phosphates having 2,2,6,6-tetramethyl

piperidinyl groups and synthetic resin composition. 4,673,701, Cl. 524-99.000.
Minear, John W.; and McNiece, Raymond J., to Delaware Halliburton Company. Tubing conveyed perforating assembly safety device. 4,673,033, Cl. 166-55.100.
Mineura, Kazuyuki: *See*—
Tomohiro, Susumu; Arai, Yuko; and Mineura, Kazuyuki, 4,673,645, Cl. 435-119.000.
Minigrip, Incorporated: *See*—
Bentsen, Per, 4,673,383, Cl. 493-381.000.
Hugues, Gilbert P. J. M.; and Ausnit, Steven, 4,672,723, Cl. 24-587.000.
Minnesota Mining and Manufacturing Company: *See*—
Archibald, G. Kent; and Slaker, Frank A., 4,673,389, Cl. 604-81.000.
Archibald, G. Kent, 4,673,390, Cl. 604-81.000.
Culler, Scott R., 4,673,354, Cl. 433-217.100.
Hammar, W. James; and Ofstead, Ronald F., 4,673,539, Cl. 264-1.100.
Hanson, Gary R.; and Rabuse, George R., 4,673,324, Cl. 412-6.000.
Siedle, Allen R., 4,673,753, Cl. 556-15.000.
Van Kampen, Craig L., 4,673,409, Cl. 623-23.000.
Mino, Kaoru; and Yanagisawa, Yoshikazu, to Diesel Kiki Co., Ltd. Cooling unit. 4,672,819, Cl. 62-298.000.
Mino, Yasutake: *See*—
Saito, Koichi; Mino, Yasutake; and Murakami, Ryoichi, 4,673,444, Cl. 148-6.15Z.
Minolta Camera Kabushiki Kaisha: *See*—
Masumoto, Hisayuki, 4,673,258, Cl. 350-427.000.
Mutoh, Masayuki; and Kamiyama, Shinji, 4,673,951, Cl. 346-75.000.
Nakai, Masaaki; Sahara, Masayoshi; and Taniguchi, Nobuyuki, 4,673,275, Cl. 354-412.000.
Sogame, Masakazu, 4,673,282, Cl. 355-14.00E.
Miranda Investments Limited: *See*—
Reilly, Frederick W., 4,673,308, Cl. 403-172.000.
Miset AG: *See*—
Sedlaczek, Walter, 4,673,491, Cl. 209-453.000.
Mishima, Tomoyoshi: *See*—
Shiraki, Yasuhiro; Katayama, Yoshifumi; Murayama, Yoshimasa; Morioka, Makoto; Sawada, Yasushi; Mishima, Tomoyoshi; Kuroda, Takao; and Maruyama, Eiichi, 4,673,959, Cl. 357-22.000.
Misra, Renuka, to United States of America, Health and Human Services. Water soluble derivatives of fredericamycin A. 4,673,678, Cl. 514-278.000.
Misuna, Yoshihiro: *See*—
Yasukawa, Akio; and Misuna, Yoshihiro, 4,672,825, Cl. 66-194.000.
Mita Industrial Co. Ltd.: *See*—
Hisajima, Masahiko; Shigemura, Yutaka; Makiura, Yoshinori; and Ishito, Mitsuya, 4,673,283, Cl. 355-14.0SH.
Mitchell, Patricia J.: *See*—
McCabe, Robert W.; and Mitchell, Patricia J., 4,673,556, Cl. 423-213.500.
Mitsuba Electric Manufacturing Co., Ltd.: *See*—
Akiyama, Tsutomu; and Kobayashi, Toshiyuki, 4,673,836, Cl. 310-239.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Hida, Toshihiko, 4,673,994, Cl. 360-85.000.
Iijima, Hitoshi; and Hama, Hiroaki, 4,672,822, Cl. 62-468.000.
Ishii, Toshiaki, 4,673,062, Cl. 187-134.000.
Kataoka, Isaburou, 4,673,919, Cl. 340-365.00A.
Kato, Hisao, 4,673,329, Cl. 414-744.00A.
Kotoh, Keigo, 4,673,936, Cl. 342-51.000.
Mitsui, Kotaro; Kato, Mari; Oda, Takao; and Yoshida, Susumu, 4,673,476, Cl. 204-192.280.
Murakami, Takashi, 4,674,094, Cl. 372-45.000.
Ozaki, Yoshio; and Tsurumoto, Kazuo, 4,673,789, Cl. 219-69.00W.
Shimoyama, Hiroyoshi, 4,673,966, Cl. 357-68.000.
Tsukamoto, Hidehiko; Kohmoto, Eiji; Asada, Koichi, deceased; Yamasaki, Masakuni; Matsumoto, Kenichi; Nakazono, Euji; Wakamiya, Yoshinori; and Kuramoto, Satoru, 4,672,830, Cl. 72-8.000.
Uchikawa, Fusaoki; Takeuchi, Morihisa; Shimamoto, Kozo; Miyao, Kunihiko; Momiyama, Kimio; and Watarai, Hisao, 4,673,910, Cl. 338-35.000.
Wake, Masayoshi; Taguchi, Osamu; and Imaizumi, Mitsuyuki, 4,673,774, Cl. 174-94.00R.
Yoshida, Kenji, 4,673,911, Cl. 187-100.000.
Yoshizawa, Kenji; Komura, Hirotsugu; Kodama, Hitoshi; Ohnuki, Kazushi; Shoda, Isao; Magome, Kazuo; and Ito, Hiroshi, 4,673,846, Cl. 315-248.000.
Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See*—
Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Kumagai, Naotake; and Tatemoto, Minoru, 4,673,193, Cl. 280-707.000.
Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Asai, Koetsu, 4,672,906, Cl. 114-74.00A.
Tsukamoto, Hidehiko; Kohmoto, Eiji; Asada, Koichi, deceased; Yamasaki, Masakuni; Matsumoto, Kenichi; Nakazono, Euji; Wakamiya, Yoshinori; and Kuramoto, Satoru, 4,672,830, Cl. 72-8.000.
Mitsubishi Oil Co., Ltd.: *See*—
Takahashi, Yoshio; and Hatanaka, Shigeto, 4,673,439, Cl. 106-287.240.
Mitsubishi Rayon Co., Ltd.: *See*—
Murashige, Yoshio; Yanagase, Akira; Kawachi, Yasunori; and Soga, Junko, 4,673,688, Cl. 514-554.000.
Uchida, Teruyoshi; Yamamori, Hisayoshi; Kojima, Hirotaka; and Tashita, Junichi, 4,672,970, Cl. 128-635.000.
Mitsui, Kotaro; Kato, Mari; Oda, Takao; and Yoshida, Susumu, to Mitsubishi Denki Kabushiki Kaisha. Antireflective film for photoelectric devices and manufacturing method thereof. 4,673,476, Cl. 204-192.280.
Mitsui Norin Co., Ltd.: *See*—
Hara, Yukihiko, 4,673,530, Cl. 252-398.000.
Mitsui Petrochemical Industries, Ltd.: *See*—
Kioka, Mamoru; and Kashiwa, Norio, 4,673,719, Cl. 526-125.000.
Mittel, James G.: *See*—
DeLuca, Michael J.; and Mittel, James G., 4,673,865, Cl. 323-222.000.
Mitzner, Horst, to Rheinische Maschinenfabrik Eisengiesserei Anton & Poper GmbH & Co. Arrangement for the changing of implements in foundry machines. 4,673,022, Cl. 164-201.000.
Miura, Kazuhiko: *See*—
Sakakibara, Nobuyoshi; Hattori, Tadashi; Miura, Kazuhiko; Noguchi, Hiroki; Fukami, Akira; and Nabeta, Teiichi, 4,673,416, Cl. 55-137.000.
Miura, Masami; and Higashiyama, Naotoshi, to NEC Corporation. Circuit for detecting the level of noise in FM signal for use in AM/FM receiver. 4,674,121, Cl. 381-10.000.
Miyagawa, Tsugio: *See*—
Orihashi, Tadaaki; Tsuji, Hiroshi; Ogawa, Kazuhiko; Hayashitani, Masao; Terada, Seiji; Miyagawa, Tsugio; and Isozaki, Hideo, 4,673,486, Cl. 208-86.000.
Miyao, Kunihiko: *See*—
Uchikawa, Fusaoki; Takeuchi, Morihisa; Shimamoto, Kozo; Miyao, Kunihiko; Momiyama, Kimio; and Watarai, Hisao, 4,673,910, Cl. 338-35.000.
Miyasaka, Katsuhiko: *See*—
Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, 4,673,692, Cl. 514-583.000.
Miyashita, Hideo; and Yoshihara, Shigeo, to NEC Corporation. Phase locked loop frequency synthesizer with battery saving circuit. 4,673,892, Cl. 331-14.000.
Miyata, Takahide; Iwashita, Kanau; Taniuchi, Kazuman; Yamamoto, Hitoshi; and Nakamichi, Katsuhiro, to Honda Giken Kogyo Kabushiki Kaisha. Two-cycle engine. 4,672,925, Cl. 123-65.0PE.
Miyatake, Yoshito; and Wagamitsu, Yasuhiko, to Matsushita Electric Industrial Co., Ltd. Liquid-cooled projection tube apparatus. 4,673,841, Cl. 313-35.000.
Miyauchi, Fumio, to Ikeda Busan Co., Ltd. Fluid joint. 4,673,200, Cl. 285-319.000.
Miyazawa, Katsuhiko: *See*—
Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, 4,673,692, Cl. 514-583.000.
Miyazono, Shunichi: *See*—
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Miyoshi, Akihiko: *See*—
Kanazawa, Hirotaka; Tanaka, Takeshi; Furutani, Shigeki; and Miyoshi, Akihiko, 4,673,189, Cl. 280-91.000.
Mizogui, Toyokazu: *See*—
Someya, Hiromi; Aihara, Yoshihiko; Mizogui, Toyokazu; and Suzuki, Nobuyuki, 4,673,277, Cl. 354-474.000.
Mizumoto, Yasuharu: *See*—
Hata, Ryosuke; Yamanouchi, Shosuke; Hirose, Masayuki; Kuwabara, Hidemitsu; Mizumoto, Yasuharu; and Hagiuda, Yasuhiro, 4,673,607, Cl. 428-172.000.
Mizuno, Masao, to Omron Tateisi Electronics Co. System for collecting and processing data relating to moving bodies. 4,674,069, Cl. 367-90.000.
Mobay Corporation: *See*—
Krishnan, Sivaram; and Grigo, Ulrich R., 4,673,699, Cl. 524-94.000.
Sandefur, Charles W.; and Thomas, Thomas J., 4,673,410, Cl. 8-528.000.
Mobil Oil Corporation: *See*—
Baugh, Benton F.; and Panicker, Narayana N., 4,673,313, Cl. 405-195.000.
Cullick, Alvin S., 4,672,840, Cl. 73-38.000.
Derouane, Eric G.; and von Ballmoos, Roland, 4,673,559, Cl. 423-306.000.
Sharps, Gordon V., Jr.; and Su, Tien-Kuei, 4,673,711, Cl. 525-240.000.
Zemanek, Joseph, Jr., 4,674,067, Cl. 367-25.000.
Mochida, Yoshihiro; Adachi, Nobuo; and Shirahama, Ichiro, to ORC Manufacturing Co., Ltd. Film thickness measuring apparatus employing microprojector of spectral reflection measurement. 4,673,294, Cl. 356-381.000.
Modublox & Co., Inc.: *See*—
Sheriff, Jack W., 4,673,949, Cl. 343-825.000.
Mohaupt, Henry H. Well completion technique. 4,673,039, Cl. 166-281.000.
Mohr, Larry D. Belt cleaning apparatus. 4,672,985, Cl. 134-57.00R.
Moisel, Hartmut: *See*—
Diskowski, Jorg; Jeppel, Wolfgang; Moisel, Hartmut; and Spiess, Hans P., 4,674,061, Cl. 364-571.000.
Molecular Genetics Research and Development Limited Partnership: *See*—
George, Henry J.; Krzyzek, Richard A.; Enquist, Lynn W.; and Watson, Roger J., 4,673,641, Cl. 435-68.000.

Mombelli, Paul, to MER/I.C.B. Electromechanical lock actuable simultaneously by several programmable codes, by one or more users and whose eccentric for unlocking the bolt is eccentrically mounted directly on the motor shaft. 4,672,826, Cl. 70-278.000.

Momiyama, Kimio: *See—*
Uchikawa, Fusaoki; Takeuchi, Morihisa; Shimamoto, Kozo; Miyao, Kunihiko; Momiyama, Kimio; and Watarai, Hisao, 4,673,910, Cl. 338-35.000.

Monarch Marking Systems, Inc.: *See—*
Strausburg, Larry D., 4,673,120, Cl. 227-67.000.

Moncrief, Jack W.: *See—*
Popovich, Robert P.; and Moncrief, Jack W., 4,673,385, Cl. 604-28.000.

Monday, Richard D.: *See—*
Subramanian, Mahadevan; Monday, Richard D.; Johnson, David B.; and Kleinschrodt, Frank J., 4,673,490, Cl. 208-354.000.

Monet, Paul E.; and Dufresne, Yves, to Harris Corporation. Method and apparatus for automatic dialing in mobile radio telephone systems. 4,674,111, Cl. 379-58.000.

Mongin, Roger: *See—*
Kling, Bernard; Mongin, Roger; and Leguennec, Michel, 4,673,245, Cl. 350-96.200.

Monier, Jean-Claude: *See—*
Thominet, Michel; Acher, Jacques; and Monier, Jean-Claude, 4,673,686, Cl. 514-359.000.

Monsanto Company: *See—*
Coleman, James P.; Kvakovszky, George; and Sikora, David J., 4,673,508, Cl. 210-698.000.

Montedison S.p.A.: *See—*
Dalcanale, Enrico, 4,673,759, Cl. 560-122.000.

Montierth, Max R.: *See—*
Gadkaree, Kishor P.; Montierth, Max R.; and Taylor, Mark P., 4,673,658, Cl. 501-89.000.

Moore, James D. Diaphragm gas pump. 4,673,336, Cl. 417-239.000.

Moore, Jesse C. Rotary vane pump. 4,673,343, Cl. 418-173.000.

Morey, Mangala A.: *See—*
Urban, Carol A.; and Morey, Mangala A., 4,674,107, Cl. 378-98.000.

Morgan Corporation: *See—*
Curran, Barry D., 4,673,048, Cl. 177-146.000.

Mori Machinery Co., Ltd.: *See—*
Ishikawa, Kazutomi, 4,673,319, Cl. 409-234.000.

Mori, Masanori: *See—*
Takagi, Yoshito; Wakahara, Yasuyuki; Hamano, Satoru; Mori, Masanori; Hamaguchi, Masayuki; and Yoshikawa, Naoki, 4,673,838, Cl. 310-239.000.

Morimoto, Yoshihiko, to Fuji Jukogyo Kabushiki Kaisha. Control system for an infinitely variable transmission. 4,672,864, Cl. 74-866.000.

Morinaga, Michio; Ikeda, Akira; and Shinohara, Akira, to Ihara Chemical Industry Co., Ltd. Process for producing an indoline. 4,673,749, Cl. 548-490.000.

Morioka, Makoto: *See—*
Shiraki, Yasuhiro; Katayama, Yoshifumi; Murayama, Yoshimasa; Morioka, Makoto; Sawada, Yasushi; Mishima, Tomoyoshi; Kuroda, Takao; and Maruyama, Eiichi, 4,673,959, Cl. 357-22.000.

Morisada, Shinya: *See—*
Ishizumi, Kikuo; Ohashi, Naohito; Tanno, Norihiko; Sato, Hiromi; Fukui, Masaru; and Morisada, Shinya, 4,673,668, Cl. 514-34.000.

Morita, Keitoku, to Kyocera Corporation. Photoelectric converter device having reduced output noise. 4,673,821, Cl. 250-578.000.

Morita, Shigeru: *See—*
Hoguchi, Tetsuya; and Morita, Shigeru, 4,672,729, Cl. 29-159.200.

Morita, Shinichi, to Sun Engineering Co., Ltd. Paper feeding device for box making machine. 4,673,175, Cl. 271-10.000.

Moritz, Werner, to Kabelschlepp Gesellschaft mit beschrankter Haftung. Guide chain for guiding energy lines. 4,672,805, Cl. 59-78.100.

Morley, Harold T., Jr. Hexagon tile game. 4,673,185, Cl. 273-294.000.

Moroto, Shuzo; Taniguchi, Takao; and Sakakibara, Shiro, to Aisin-Warner Limited. Power delivery system. 4,673,071, Cl. 192-3.210.

Morotomi, Noriaki: *See—*
Kobo, Kazuo; Morotomi, Noriaki; and Sato, Takeshi, 4,673,979, Cl. 358-142.000.

Morris, George Q. Fuel admixture device. 4,673,536, Cl. 261-78.100.

Morris, Gregory J. E.; Grosshandler, Sandor; Beaver, Richard N.; Pimlott, John R.; and Dang, Hiep D., to Dow Chemical Company, The. Fabricated electrochemical cell. 4,673,479, Cl. 204-279.000.

Morris, John C.: *See—*
Jackson, Winston J., Jr.; and Morris, John C., 4,673,726, Cl. 528-288.000.

Morrissey, Ronald J.; and Kroll, Harry, to Technic Inc. Method and electroplating solution for deposition of palladium or alloys thereof. 4,673,472, Cl. 204-44.600.

Morrow, Keith: *See—*
Ferguson, Harry D.; Lee, Kar-Kui; Oliver, William; Kwong, Fat-Cho; Young, Ronald; Hammell, Jim; Morrow, Keith; and Chaudhary, Rashid A., 4,673,920, Cl. 340-521.000.

Mortimer, John H., to Inductotherm Corporation. Apparatus and method for maintaining constant molten metal level in metal casting. 4,673,025, Cl. 164-457.000.

Moser, Helmut; Greve, Manfred; Pedrazzi, Reinhard; and Wald, Roland, to Sandoz Ltd. Azo compounds having at least one 6-hydroxypyrid-2-one coupling component radical metal complexes thereof and intermediates therefor. 4,673,735, Cl. 534-606.000.

Motoe, Hisafumi: *See—*
Sarugaku, Toshio; Motoe, Hisafumi; Tokuhara, Masaharu; and Hongu, Masayuki, 4,673,983, Cl. 358-183.000.

Motorola, Inc.: *See—*
Bai, Monty W.; Titus, John D.; and Farace, Louis P., 4,673,777, Cl. 200-61.45R.
Bickley, Robert H.; and Culver, Robin D., 4,673,886, Cl. 330-298.000.
Bujalski, Joseph; and Welk, John R., 4,673,930, Cl. 340-703.000.
Davis, William F., 4,673,867, Cl. 323-315.000.
DeLuca, Michael J.; and Mittel, James G., 4,673,865, Cl. 323-222.000.
Fetty, Allan M., 4,673,443, Cl. 134-25.400.

Motoyama, Tadashi: *See—*
Otsuka, Toru; and Motoyama, Tadashi, 4,674,078, Cl. 369-44.000.

Mott, Bradley: *See—*
Kalmus, Leslie P.; Trojan, Donald R.; Mott, Bradley; and Strampfer, John, 4,674,044, Cl. 364-408.000.

Mourey, Bruno: *See—*
Hehlen, Robert; Hareng, Michel; Le Berre, Serge; and Mourey, Bruno, 4,673,256, Cl. 350-350.00S.

Mukai, Tadashi: *See—*
Tsushima, Noburu; Fuse, Masashi; Mimori, Teruo; Sasaki, Toshio; and Mukai, Tadashi, 4,673,878, Cl. 324-226.000.

Muller, Manfred: *See—*
Meixner, Jurgen; Muller, Manfred; and Kremer, Wolfgang, 4,673,758, Cl. 560-90.000.

Munning, Hans; Bock, Jurgen; Oldach, Bernd; Ladic, Josef; Rauert, Max-Otto; Emde, Hugo; Petzsch, Dietrich; and de Baan, Johannes J., to August Bilstein GmbH & Co. KG. Adjustable shock absorber, especially for motor vehicles. 4,673,067, Cl. 188-299.000.

Murakami, Keinosuke; Enami, Kazumasa; and Yagi, Nobuyuki, to Nippon Hoso Kyokai. Video-signal time-axis correction apparatus. 4,673,980, Cl. 358-149.000.

Murakami, Ryoichi: *See—*
Saito, Koichi; Mino, Yasutake; and Murakami, Ryoichi, 4,673,444, Cl. 148-6.15Z.

Murakami, Susumu; and Honda, Hiroo, to Okumura Corporation. Tunnel excavation method. 4,673,218, Cl. 299-15.000.

Murakami, Takashi, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser with an active layer having varying thicknesses. 4,674,094, Cl. 372-45.000.

Murakami, Yuichi; and Yamamoto, Tomohiro, to Aisin Seiki Kabushiki Kaisha. Safety device for electronic equipments. 4,673,832, Cl. 307-326.000.

Muramatsu, Shigeru: *See—*
Anahara, Meiji; Muramatsu, Shigeru; Takagi, Isamu; and Tuboi, Masayoshi, 4,672,804, Cl. 57-401.000.

Murashige, Yoshio; Yanagase, Akira; Kawachi, Yasunori; and Soga, Junko, to Mitsubishi Rayon Co., Ltd. Partial amine salts of EDTA as blood anticoagulant. 4,673,688, Cl. 514-554.000.

Murata, Akira: *See—*
Satoh, Ryohei; Oshima, Muneo; Tanaka, Minoru; Sakaguchi, Suguru; Murata, Akira; and Hirota, Kazuo, 4,673,772, Cl. 174-52.0FP.

Murata Erie North America, Ltd.: *See—*
Blamire, Michael F.; Briscoe, Peter F.; McLeod, Douglas D.; Doolittle, B. Kingsley; and Roach, Michael J., 4,673,900, Cl. 333-167.000.

Murata Kikai Kabushiki Kaisha: *See—*
Ichiba, Yoshiyuki, 4,673,138, Cl. 242-35.50R.

Murata Manufacturing Co., Ltd.: *See—*
Takeda, Tomoyuki; and Ito, Yoji, 4,673,902, Cl. 333-202.000.

Murayama, Kunihiko: *See—*
Watanabe, Takahiko; Sugano, Toshiyuki; Yamamoto, Yasushi; and Murayama, Kunihiko, 4,673,541, Cl. 264-25.000.

Murayama, Yoshimasa: *See—*
Shiraki, Yasuhiro; Katayama, Yoshifumi; Murayama, Yoshimasa; Morioka, Makoto; Sawada, Yasushi; Mishima, Tomoyoshi; Kuroda, Takao; and Maruyama, Eiichi, 4,673,959, Cl. 357-22.000.

Murota, Seiitsu: *See—*
Wakabayashi, Toshio; Takai, Makoto; Ichikawa, Shuji; Arai, Junichiro; and Murota, Seiitsu, 4,673,684, Cl. 514-327.000.

Murphy, John J. Wall system construction, parts and methods of assembly. 4,672,787, Cl. 52-409.000.

Murphy, Richard; and Capron, John, to Foss Manufacturing Co., Inc. Stiff fray resistant mat material. 4,673,615, Cl. 428-286.000.

Murray, Kevin P.: *See—*
Ansel, Robert E.; and Murray, Kevin P., 4,673,705, Cl. 524-850.000.

Musolff, Frank; and Sillmann, Volker, to Allied Corporation. Connector assembly. 4,673,236, Cl. 439-609.000.

Musso, Giorgio: *See—*
Filauro, Paolo; and Musso, Giorgio, 4,673,804, Cl. 235-463.000.

Muszik, Janos: *See—*
Schroer, Wolf-Dieter; Muszik, Janos; Cramm, Gunther; and Benn, Otto, 4,673,729, Cl. 528-397.000.

Mutoh, Masayuki; and Kamiyama, Shinji, to Minolta Camera Kabushiki Kaisha. Tone reproducible ink jet printer. 4,673,951, Cl. 346-75.000.

Myers, Lawrence R., to Allied Corporation. Reaction mechanism for brake booster. 4,672,883, Cl. 91-369.00A.

Myers, Nancy E.; Gamblin, Rodger L.; and Sugg, David J., to Burlington Industries, Inc. Commercial nickel phosphorus electroplating. 4,673,468, Cl. 204-24.000.

N. J. Phillips Pty. Limited: *See—*
Phillips, Ian R.; Lodge, Robert H.; and Bunyan, Glen W., 4,673,387, Cl. 604-62.000.

Phillips, Ian R., 4,673,395, Cl. 604-191.000.

Nabeta, Teiichi: *See—*
Sakakibara, Nobuyoshi; Hattori, Tadashi; Miura, Kazuhiko; Noguchi, Hiroki; Fukami, Akira; and Nabeta, Teiichi, 4,673,416, Cl. 55-137.000.

Nagaoka, Yoshitomi; Matsuda, Yoshiteru; Hirao, Yoshiaki; Kuga, Ryuichiro; and Asakura, Hiroyuki, to Matsushita Electric Industrial Co., Ltd. Automatic focusing apparatus for camera. 4,673,274, Cl. 354-403.000.

Nagatomo, Shigemi: *See—*
Hayano, Makoto; Nagatomo, Shigemi; Sakata, Hirotsugu; Hatori, Mitsuo; and Hattori, Hitoshi, 4,673,339, Cl. 418-15.000.

Nagy, Geza: *See—*
Pungor, Erno; Toth, Klara S.; Feher, Zsofia; Nagy, Geza; and Horvai, Gyorgy, 4,673,295, Cl. 356-440.000.

Nahas, Joseph J.: *See—*
Crouch, Paul E.; Nahas, Joseph J.; and Ng, Howard, 4,674,114, Cl. 379-154.000.

Nakagawa, Yukio: *See—*
Matsumoto, Tokikazu; Nakagawa, Yukio; and Uchiyama, Shinich, 4,673,970, Cl. 358-27.000.

Nakahama, Ryoji: *See—*
Iwai, Tomio; and Nakahama, Ryoji, 4,673,358, Cl. 440-61.000.

Nakahara, Yutaka: *See—*
Minagawa, Motonobu; Nakahara, Yutaka; Shibata, Toshihiro; and Arata, Ryozo, 4,673,701, Cl. 524-99.000.

Nakai, Masaaki; Sahara, Masayoshi; and Taniguchi, Nobuyuki, to Minolta Camera Kabushiki Kaisha. Camera system operable by carrying data from a camera accessory to a camera body. 4,673,275, Cl. 354-412.000.

Nakajima, Kenei: *See—*
Shochi, Toshiyuki; and Nakajima, Kenei, 4,673,173, Cl. 269-32.000.

Nakajima, Kunio: *See—*
Yamada, Hideo; Ichiki, Shigemi; Naniwa, Hisamoto; Uchida, Susumu; Kadokura, Kenji; Tsunoda, Susumu; and Nakajima, Kunio, 4,674,127, Cl. 383-6.000.

Nakamichi, Katsuhiro: *See—*
Miyata, Takahide; Iwashita, Kanau; Taniuchi, Kazuman; Yamamoto, Hitoshi; and Nakamichi, Katsuhiro, 4,672,925, Cl. 123-65.0PE.

Nakamura, Ichiro. Balanced door for airplane lavatories and the like. 4,672,772, Cl. 49-253.000.

Nakamura, Mamoru: *See—*
Kugo, Masaru; Igarashi, Osamu; Katogi, Kozo; Ito, Hiroshi; and Nakamura, Mamoru, 4,673,252, Cl. 350 V-339.00F.

Nakamura, Shinya: *See—*
Hosono, Chihiro; Hayakawa, Yoichi; Kubo, Seitoku; Taga, Yutaka; and Nakamura, Shinya, 4,673,072, Cl. 192-3.570.

Nakamura, Yasuo: *See—*
Kawada, Tsutomu; and Nakamura, Yasuo, 4,672,734, Cl. 29-517.000.

Nakanishi, Sadayuki; and Hayama, Kenichi, to Kabushiki Kaisha Kobe Seiko Sho. Sealing mechanism for a ball valve. 4,673,164, Cl. 251-174.000.

Nakanishi, Tatsuo: *See—*
Yamazaki, Toshinori; Nakanishi, Tatsuo; Marukawa, Yuji; Takenouchi, Shigeki; and Nomori, Hiroyuki, 4,673,629, Cl. 430-58.000.

Nakanishi, Tsuneo: *See—*
Shin, Shigeo; Takatsu, Tamao; Saito, Teiichiro; Kikuchi, Akiyoshi; and Nakanishi, Tsuneo, 4,673,123, Cl. 228-263.130.

Nakano, Chikao: *See—*
Hirai, Kazumi; Akiyoshi, Mitsuo; Nakano, Chikao; Watanabe, Kenji; and Kodama, Satoru, 4,673,800, Cl. 219-518.000.

Nakano, Kiyoshi: *See—*
Ueyama, Masato; Kanamaru, Takeshi; Shirai, Toshikazu; and Nakano, Kiyoshi, 4,673,075, Cl. 198-339.100.

Nakano, Tsunetomo; Yasuno, Hiroshi; and Nishio, Kazuaki, to Ube Industries, Ltd. Multilayer printed circuit board. 4,673,773, Cl. 174-68.500.

Nakao, Kazuwa: *See—*
Kiso, Yoshiaki; and Nakao, Kazuwa, 4,673,732, Cl. 530-326.000.

Nakao, Sho: *See—*
Kunichika, Kenji; Kagawa, Yoshikatsu; Ohishi, Chikashi; Nakao, Sho; and Asao, Yasuzi, 4,673,627, Cl. 430-49.000.

Nakashima, Hirohisa: *See—*
Matsuo, Kazuhiko; Hasegawa, Teruyuki; Kuwano, Seigo; Yamaguchi, Ryuji; Shiwata, Akio; Hamada, Yoneichi; Komatsu, Yoshimi; Kondo, Tsuneo; Shirotani, Yusuke; Nakashima, Hirohisa; and Matsuda, Yasuhiro, 4,674,101, Cl. 373-95.000.

Nakato, Hakaru; Nozaki, Tsutomu; Kinoshita, Katsuo; Habu, Yasuhiro; Ohnuma, Hiroaki; Ohmiya, Shigeru; and Kimura, Tomoaki, to Kawasaki Steel Corporation; and Hitachi Ltd. Continuous casting apparatus for the production of cast sheets. 4,673,024, Cl. 164-431.000.

Nakauchi, Kenji: *See—*
Furutera, Masaharu; Furukawa, Tetsuro; Matsushita, Yoshiaki; and Nakauchi, Kenji, 4,672,821, Cl. 62-324.200.

Nakaya, Keiichi: *See—*
Senoue, Makoto; Terase, Kunihiko; and Nakaya, Keiichi, 4,673,558, Cl. 423-240.000.

Nakayama, Hajime; Aoki, Osamu; Nishijima, Shigetoshi; Horiuchi, Haruo; Sugino, Takuya; and Takagi, Shuichi, to Honda Giken Kogyo Kabushiki Kaisha. Air-fuel mixture flow control structure and method of making the same. 4,672,940, Cl. 123-590.000.

Nakayama, Syoichi; Inui, Keita; and Suzuki, Setsuo, to Sumitomo Bakelite Company Limited. Composite substrate plate for magnetic or optical disk and process for production thereof. 4,673,602, Cl. 428-65.000.

Nakazono, Euji: *See—*
Tsukamoto, Hidehiko; Kohmoto, Eiji; Asada, Koichi, deceased; Yamasaki, Masakuni; Matsumoto, Kenichi; Nakazono, Euji; Wakamiya, Yoshinori; and Kuramoto, Satoru, 4,672,830, Cl. 72-8.000.

Nalco Chemical Company: *See—*
Richardson, Paul F.; and Bhattacharyya, Bhupati R., 4,673,511, Cl. 210-734.000.

Namiki, Yasuomi; and Kawasaki, Satoshi, to Victor Company of Japan, Ltd. Video signal recording and/or reproducing apparatus having a function of carrying out assembled recordings. 4,673,991, Cl. 360-14.100.

Nanba, Keizo: *See—*
Sugiyama, Yoshihiko; Nanba, Keizo; Hagiwara, Michiki; Aoki, Takeshi; Iwasaki, Shosuke; and Abiko, Tetsuo, 4,673,551, Cl. 420-535.000.

Naniwa, Hisamoto: *See—*
Yamada, Hideo; Ichiki, Shigemi; Naniwa, Hisamoto; Uchida, Susumu; Kadokura, Kenji; Tsunoda, Susumu; and Nakajima, Kunio, 4,674,127, Cl. 383-6.000.

Narasimhan, Mandayam J.: *See—*
Thirumalachar, Mandayam J.; Narasimhan, Mandayam J.; and Thirumalachar, Mandayam J. K., 4,673,687, Cl. 514-460.000.

Narita, Hirokazu: *See—*
Sadaki, Hiroshi; Narita, Hirokazu; Imaizumi, Hiroyuki; Konishi, Yoshinori; Inaba, Takihiro; Hirakawa, Tatsuo; Taki, Hideo; Tai, Masaru; Watanabe, Yasuo; and Saikawa, Isamu, 4,673,738, Cl. 540-222.000.

Naruse, Yoshihiro, to Aisin Seiki Kabushiki Kaisha. Reflective object detecting apparatus. 4,674,073, Cl. 367-105.000.

Nath, Monmohan K.: *See—*
Nath, Narender K.; and Nath, Monmohan K., 4,672,983, Cl. 132-7.000.

Nath, Narender K.; and Nath, Monmohan K. Hair coloring. 4,672,983, Cl. 132-7.000.

National Biomedical Research Foundation: *See—*
Ledley, Robert S., 4,673,973, Cl. 358-93.000.

National Research Institute for Metals: *See—*
Irie, Hirosada; and Tukamoto, Susumu, 4,673,794, Cl. 219-121.0ED.

National Sanitary Laboratories, Inc.: *See—*
McCormick, Gary D., 4,673,074, Cl. 194-236.000.

National Starch and Chemical Corporation: *See—*
Tsai, John J.; and Tessler, Martin M., 4,673,707, Cl. 525-54.200.

Navistar International Corporation: *See—*
Pelz, Edward C., 4,673,151, Cl. 248-74.100.

Naylor Bros. (Clayware) Limited: *See—*
Pritchatt, Robert J., 4,673,198, Cl. 285-292.000.

NCR Corporation: *See—*
Mazumder, Ali T.; and Fairey, Brian M., 4,673,141, Cl. 242-75.470.

NEC Corporation: *See—*
Inaba, Masao; and Kashigi, Kazuo, 4,673,975, Cl. 380-14.000.
Kobayashi, Kohroh, 4,674,100, Cl. 372-96.000.
Masuda, Shinji, 4,673,866, Cl. 323-313.000.
Miura, Masami; and Higashiyama, Naotoshi, 4,674,121, Cl. 381-10.000.
Miyashita, Hideo; and Yoshihara, Shigeo, 4,673,892, Cl. 331-14.000.
Sato, Yoshikuni, 4,674,063, Cl. 364-900.000.
Setoyama, Youichi, 4,673,952, Cl. 346-76.0PH.
Yamawaki, Seiichi; Obuchi, Tomoki; Toyama, Noboru; and Shogen, Kazuyoshi, 4,673,905, Cl. 333-239.000.
Yokoyama, Hiroshi, 4,673,942, Cl. 342-368.000.

NEC Home Electronics Ltd.: *See—*
Kumasaka, Toru; Kamiji, Koichi; and Ohya, Toshikazu, 4,673,912, Cl. 340-52.00R.

Nee, Hanphire H., to CBS Inc. Method of manufacturing fine-grained copper substrate for optical information carrier. 4,673,467, Cl. 204-23.000.

Negishi, Masami: *See—*
Mabe, Atsushi; and Negishi, Masami, 4,673,340, Cl. 418-15.000.

Nelson, John E.; Grossheim, Edward T.; and Perelman, Franklin M., to Gould Inc. Circuit for processing digital image data in a high resolution raster display system. 4,673,929, Cl. 340-703.000.

Nelson, Mark L.: *See—*
Nelson, Otis L., Jr.; and Nelson, Mark L., 4,673,411, Cl. 44-53.000.

Nelson, Otis L., Jr.; and Nelson, Mark L., to Polar Molecular Corporation. Anti-gel fuel composition. 4,673,411, Cl. 44-53.000.

Nelson, Ralph F.; and Stephen, Donald S. Weed puller. 4,673,165, Cl. 254-132.000.

Neppl, Franz: *See—*
Hieber, Konrad; and Neppl, Franz, 4,673,968, Cl. 357-71.000.

Neptune Water Meter Company: *See—*
Brennan, William J., Jr.; and Cottle, Charles A., 4,674,113, Cl. 379-107.000.

Nerrinck, Bernard: *See—*
Benoit, Louis; and Nerrinck, Bernard, 4,672,755, Cl. 36-117.000.

Nespor, Tony. Thermal wire stripper. 4,672,865, Cl. 81-9.400.

Neste Oy: *See—*
Lofgren, Barbro U.; Luciani, Luciano; Seppanen, Hanneli; Stjernberg, Maria H.; and Iiskola, Eero I., 4,673,661, Cl. 502-111.000.

Nestle & Fischer: *See—*
Rickus, Edmund, 4,673,287, Cl. 356-4.000.

Nevin, Donald M. Apparatus for applying a light-curable dental composition. 4,673,353, Cl. 433-90.000.

Newham, Paul, to Marconi Company Limited, The. Cassegrain aerial system. 4,673,947, Cl. 343-781.0CA.
Newton, William P.; and Flight, Robert S., to Caldwell Manufacturing Company. Spring coupler for block and tackle window balance system. 4,672,713, Cl. 16-197.000.
Ng, Howard: *See*—
Crouch, Paul E.; Nahas, Joseph J.; and Ng, Howard, 4,674,114, Cl. 379-154.000.
NGK Insulators, Ltd.: *See*—
Abe, Fumio; Hasegawa, Hiroshi; Fujita, Tadashi; and Maeda, Makoto, 4,673,349, Cl. 431-328.000.
NGK Spark Plug Co., Ltd.: *See*—
Takeuchi, Tadashi; and Ushida, Kunihiro, 4,672,839, Cl. 73-35.000.
Nichols, Ann M.: *See*—
Lassen, Frederich O.; Sherrod, Earle H.; Nichols, Ann M.; and Serbiak, Paul J., 4,673,403, Cl. 604-385.00R.
Nickel, Hans: *See*—
Wissmann, Michael; Nickel, Hans; and Weber, Jurgen, 4,672,929, Cl. 123-179.00G.
Nicodemus, Carl D., to Helios Research Corp. Gas compression with hydrokinetic amplifier. 4,673,335, Cl. 417-54.000.
Nielinger, Werner; Brinkmeyer, Hermann; Binsack, Rudolf; Bottenbruch, Ludwig; and Fullmann, Heinz-Josef, to Bayer Aktiengesellschaft. Process for the production of copolyamide from aromatic dicarboxylic acids, adipic acid and hexamethylene diamine. 4,673,728, Cl. 528-339.000.
Nieskens, Martin J. P. C.; and Ramamurthy, Ramalinga, to Shell Oil Company. Process for removing hydrogen sulfide from gases. 4,673,557, Cl. 423-230.000.
Nigol, Olaf; Barrett, John S.; and Green, Martin A. Low-loss and low-torque ACSR conductors. 4,673,775, Cl. 174-130.000.
Nigorikawa, Kazunori: *See*—
Sugimori, Shigeru; Ogawa, Tetsuya; Goto, Yasuyuki; Isoyama, Toyoshiro; Nigorikawa, Kazunori; Kitano, Kisei; Yoshida, Naoyuki; and Furukawa, Yoshito, 4,673,529, Cl. 252-299.630.
Nihon Matai Co., Ltd.: *See*—
Yamada, Hideo; Ichiki, Shigemi; Naniwa, Hisamoto; Uchida, Susumu; Kadokura, Kenji; Tsunoda, Susumu; and Nakajima, Kunio, 4,674,127, Cl. 383-6.000.
Niimi, Takatsune: *See*—
Yamazawa, Yasushi; Kondo, Katsumi; Tsutiya, Yasuhiro; Niimi, Takatsune; Yamamoto, Takashi; and Matsuba, Kunihiro, 4,673,451, Cl. 156-172.000.
Nilsson, Carl O. L. Safety device in a repeating rifle. 4,672,762, Cl. 42-70.010.
Nimberger, Spencer M., to General Screw Products Company. Pressure signal instrumentation having removable flanges and mounting method therefor. 4,672,728, Cl. 29-157.00R.
Nimry, Tayseer S.; and De Simone, Richard E., to Amoco Corporation. AMS-1B crystalline borosilicate molecular sieve-based catalyst compositions and process for toluene alkylation. 4,673,767, Cl. 585-467.000.
Nippon Air Brake Co., Ltd.: *See*—
Kojima, Katsumi, 4,673,419, Cl. 55-163.000.
Nippon Columbia Co. Ltd.: *See*—
Yoshimoto, Shin-ichi; Ando, Reigo; Shirai, Takeshi; and Nomura, Hiroshi, 4,674,077, Cl. 369-37.000.
Nippon Electric Co. Ltd.: *See*—
Iwashita, Masao; and Tenma, Tsutomu, 4,674,034, Cl. 364-200.000.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Sakai, Toshiaki, 4,673,515, Cl. 252-12.000.
Sugiyama, Jun; Suzuki, Akira; Terada, Kosei; Oguri, Shigenori; and Ishii, Shigeki, 4,672,876, Cl. 84-1.030.
Suzuki, Hideo, 4,672,875, Cl. 84-1.010.
Nippon Hoso Kyokai: *See*—
Murakami, Keinosuke; Enami, Kazumasa; and Yagi, Nobuyuki, 4,673,980, Cl. 358-149.000.
Nippon Kokan Kabushiki Kaisha: *See*—
Kagechika, Hiroshi; Tonouchi, Akira; and Kammel, Roland, 4,673,471, Cl. 204-44.500.
Matsuo, Kazuhiko; Hasegawa, Teruyuki; Kuwano, Seigo; Yamaguchi, Ryuji; Shiwata, Akio; Hamada, Yoneichi; Komatsu, Yoshimi; Kondo, Tsuneo; Shirotani, Yusuke; Nakashima, Hirohisa; and Matsuda, Yasuhiro, 4,674,101, Cl. 373-95.000.
Nippon Paint Co., Ltd.: *See*—
Ishikawa, Katsukiyo; Nishijima, Kanji; and Seio, Mamoru, 4,673,458, Cl. 156-659.100.
Nippon Soken, Inc.: *See*—
Akita, Shigeyuki; and Kago, Yoshiyuki, 4,673,913, Cl. 340-52.00R.
Sakakibara, Nobuyoshi; Hattori, Tadashi; Miura, Kazuhiko; Noguchi, Hiroki; Fukami, Akira; and Nabeta, Teiichi, 4,673,416, Cl. 55-137.000.
Taguchi, Takasi; Ueno, Yoshiki; and Hattori, Tadashi, 4,673,248, Cl. 350-166.000.
Nippon Steel Corporation: *See*—
Sakai, Kango; and Shimokawa, Yasuo, 4,673,447, Cl. 148-156.000.
Nippon Welding Rod Co., Ltd.: *See*—
Shin, Shigeo; Takatsu, Tamao; Saito, Teiichiro; Kikuchi, Akiyoshi; and Nakanishi, Tsuneo, 4,673,123, Cl. 228-263.130.
Nippon Yusen Kaisha: *See*—
Yamada, Hideo; Ichiki, Shigemi; Naniwa, Hisamoto; Uchida, Susumu; Kadokura, Kenji; Tsunoda, Susumu; and Nakajima, Kunio, 4,674,127, Cl. 383-6.000.
Nippondenso Co., Ltd.: *See*—
Saito, Muneo; and Hayakawa, Shoichi, 4,673,921, Cl. 340-539.000.
Sakakibara, Nobuyoshi; Hattori, Tadashi; Miura, Kazuhiko; Noguchi, Hiroki; Fukami, Akira; and Nabeta, Teiichi, 4,673,416, Cl. 55-137.000.
Takagi, Yoshito; Wakahara, Yasuyuki; Hamano, Satoru; Mori, Masanori; Hamaguchi, Masayuki; and Yoshikawa, Naoki, 4,673,838, Cl. 310-239.000.
Nishijima, Kanji: *See*—
Ishikawa, Katsukiyo; Nishijima, Kanji; and Seio, Mamoru, 4,673,458, Cl. 156-659.100.
Nishijima, Shigetoshi: *See*—
Nakayama, Hajime; Aoki, Osamu; Nishijima, Shigetoshi; Horiuchi, Haruo; Sugino, Takuya; and Takagi, Shuichi, 4,672,940, Cl. 123-590.000.
Nishio, Hisaharu: *See*—
Taniguchi, Masato; Nishio, Hisaharu; Kawamura, Mitsuyoshi; and Okumura, Toshio, 4,672,933, Cl. 123-270.000.
Nishio, Kazuaki: *See*—
Nakano, Tsunetomo; Yasuno, Hiroshi; and Nishio, Kazuaki, 4,673,773, Cl. 174-68.500.
Nishiwaki, Yoshikazu; Matsuoka, Shunji; and Okamoto, Kenji, to Sumitomo Electric Industries, Ltd. Diffraction gratings and optical branching filter elements. 4,673,241, Cl. 350-3.640.
Nishiyama, Yuji; Kitano, Tâteo; and Hashimoto, Masakazu, to Toyota Jidosha Kabushiki Kaisha. Belt anchor incorporating a seat track structure. 4,673,217, Cl. 297-473.000.
Nishizawa, Jun-ichi; and Kondoh, Hisao, to Research Development, Corporation of Japan. Pressurized contact type double gate static induction thyristor. 4,673,961, Cl. 357-22.000.
Nishizawa, Jun-ichi, to Fuji Photo Film Co., Ltd. Semiconductor image sensor. 4,673,985, Cl. 358-213.120.
Nissan Motor Co., Ltd.: *See*—
Abo, Toshimi; and Ueno, Takashi, 4,672,814, Cl. 60-602.000.
Hoshino, Shigeo, 4,672,849, Cl. 73-579.000.
Kawajiri, Mitugu, 4,673,005, Cl. 139-435.000.
Kubo, Jun, 4,674,049, Cl. 364-426.000.
Kubo, Jun, 4,674,050, Cl. 364-426.000.
Sugasawa, Fukashi, 4,673,194, Cl. 280-707.000.
Suzuki, Tadashi; Futami, Toru; and Sakagami, Atsushi, 4,674,084, Cl. 370-85.000.
Tabata, Toshiyuki, 4,673,156, Cl. 248-559.000.
Takatsuji, Kouichi; and Takasaki, Masaru, 4,674,014, Cl. 362-80.000.
Nitto Boseki Co., Ltd.: *See*—
Itoh, Shimpei; and Sasakura, Tadao, 4,673,598, Cl. 427-412.000.
Niwa, Kenji; and Ichikawa, Ichiro, to Sumitomo Chemical Company, Limited. Method of purifying tantalum. 4,673,554, Cl. 423-63.000.
Nix, Paul T.: *See*—
Kelleher, Thomas J.; and Nix, Paul T., 4,673,633, Cl. 435-4.000.
Noda, Shoji: *See*—
Kamigaito, Osami; Noda, Shoji; and Doi, Haruo, 4,673,587, Cl. 427-38.000.
Nofre, Claude; and Tinti, Jean M., to Universite Claude Bernard/Lyon 1. Novel sweetening agents, process for sweetening various products and compositions containing such sweetening agents. 4,673,582, Cl. 426-548.000.
Noguchi, Hiroki: *See*—
Sakakibara, Nobuyoshi; Hattori, Tadashi; Miura, Kazuhiko; Noguchi, Hiroki; Fukami, Akira; and Nabeta, Teiichi, 4,673,416, Cl. 55-137.000.
Noguchi, Masahiro: *See*—
Enjo, Naonori; Noguchi, Masahiro; and Ide, Satoshi, 4,673,517, Cl. 252-67.000.
Nohara, Fujio; and Fujinawa, Tomoaki, to Ikeda Mohando Co., Ltd. Aminoalkylphenoxy derivatives. 4,673,747, Cl. 546-334.000.
Nokubo, Seiji: *See*—
Kohno, Teruhisa; Nokubo, Seiji; and Matsuoka, Akio, 4,673,220, Cl. 303-6.00C.
Nomori, Hiroyuki: *See*—
Yamazaki, Toshinori; Nakanishi, Tatsuo; Marukawa, Yuji; Takenouchi, Shigeki; and Nomori, Hiroyuki, 4,673,629, Cl. 430-58.000.
Nomura, Hiroshi: *See*—
Yoshimoto, Shin-ichi; Ando, Reigo; Shirai, Takeshi; and Nomura, Hiroshi, 4,674,077, Cl. 369-37.000.
Nordsiek, Karl-Heinz; Wolpers, Jurgen; and Tornau, Johannes, to Huls Aktiengesellschaft. Hot-vulcanizable tread strips for the manufacture of motor vehicle pneumatic tire treads; and block copolymers which can be used as the sole constituent of the rubber component which is the basic formulation component of said tread strips. 4,673,709, Cl. 525-99.000.
Northern Telecom Limited: *See*—
Grover, Wayne D., 4,674,088, Cl. 370-100.000.
Heldenbrand, Stanley W., 4,674,120, Cl. 379-427.000.
Nozaki, Tsutomu: *See*—
Nakato, Hakaru; Nozaki, Tsutomu; Kinoshita, Katsuo; Habu, Yasuhiro; Ohnuma, Hiroaki; Ohmiya, Shigeru; and Kimura, Tomoaki, 4,673,024, Cl. 164-431.000.
NPSK PO Poluprovodnikova Technika: *See*—
Vatzov, Vassil N.; Savov, Krestyo T.; and Stanev, Stefan G., 4,672,859, Cl. 74-479.000.
Nuclear Medical Products, Inc.: *See*—
Sanchez, Lawrence, 4,673,813, Cl. 250-506.100.
Nuns, Jacques; and Abraham, Joseph, to Electricite de France; and Celes. Electromagnetic induction device for heating metal elements. 4,673,781, Cl. 219-10.49R.

Nussbaumer, Manfred, to Ed. Zublin Aktiengesellschaft. Method and apparatus for the underground installation of pipelines. 4,673,312, Cl. 405-184.000.

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N.V. Optische Industrie de Oude Delft: *See*—
Oomen, Gijsbert L., 4,673,817, Cl. 250-561.000.

N.V. Weefautomaten Picanol: *See*—
Rosseel, Rik; Decock, Bernard; Wyffels, Marc; and Ampe, Frank, 4,673,004, Cl. 139-435.000.

Nyffeler, Corti AG: *See*—
Lamping, Alfons; Karth, Beat; and Hiltbrunner, Werner, 4,673,601, Cl. 428-35.000.

Nygren, Bo H.; and Stenberg, Johan E., to Astra Meditec AB. Process for providing articles with a biocompatible surface layer. 4,673,584, Cl. 427-2.000.

Nyhart, Randall E.: *See*—
Greene, Neil E.; Grubka, Lawrence J.; and Nyhart, Randall E., 4,673,428, Cl. 65-2.000.

O-Oka Forge Co. Ltd: *See*—
Hoguchi, Tetsuya; and Morita, Shigeru, 4,672,729, Cl. 29-159.200.

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Obara, Hiroshi, 4,673,793, Cl. 219-86.100.

Obara, Hiroshi, to Obara Corporation. Connecting metal fittings for resistance welder. 4,673,793, Cl. 219-86.100.

Obata, Keigo; Dohi, Nobuyasu; Okuhama, Yoshiaki; Masaki, Seishi; Okada, Yukiyoshi; and Yoshimoto, Masakazu, to Obata, Keigo; Dohi, Nobuyasu; Daiwa Fine Chemicals Co., Ltd.; and Ishihara Chemical Co., Ltd. Tin, lead, or tin-lead alloy plating bath. 4,673,470, Cl. 204-44.400.

O'Brien, John A., Jr.; and Hutson, James H. Tool tensioning device for debarking machine. 4,673,012, Cl. 144-208.00E.

Obrist, Gerhard, to Sterling Drug, Inc. Two-compartment dosing package. 4,673,107, Cl. 222-94.000.

Obuchi, Tomoki: *See*—
Yamawaki, Seiichi; Obuchi, Tomoki; Toyama, Noboru; and Shogen, Kazuyoshi, 4,673,905, Cl. 333-239.000.

Ochiai, Michihiko: *See*—
Matsuo, Taisuke, deceased; Ochiai, Michihiko; and Kishimoto, Shoji, 4,673,739, Cl. 540-355.000.

Oda, Takao: *See*—
Mitsui, Kotaro; Kato, Mari; Oda, Takao; and Yoshida, Susumu, 4,673,476, Cl. 204-192.280.

Oestreich, Ulrich, to Siemens Aktiengesellschaft. Optical cable for overhead high-tension lines. 4,673,247, Cl. 350-96.230.

Ofstead, Ronald F.: *See*—
Hammar, W. James; and Ofstead, Ronald F., 4,673,539, Cl. 264-1.100.

Ogaki, Hirokazu; Funahashi, Yasuhiro; Koie, Hiroshi; and Kurachi, Tomoko, to Brother Kogyo Kabushiki Kaisha. Software vending system. 4,674,055, Cl. 364-479.000.

Ogawa, Kazufumi, to Matsushita Electric Industrial Co., Ltd. Molecular controlled structure and method of producing the same. 4,673,474, Cl. 204-157.640.

Ogawa, Kazuhiko: *See*—
Orihashi, Tadaaki; Tsuji, Hiroshi; Ogawa, Kazuhiko; Hayashitani, Masao; Terada, Seiji; Miyagawa, Tsugio; and Isozaki, Hideo, 4,673,486, Cl. 208-86.000.

Ogawa, Tetsuya: *See*—
Sugimori, Shigeru; Ogawa, Tetsuya; Goto, Yasuyuki; Isoyama, Toyoshiro; Nigorikawa, Kazunori; Kitano, Kisei; Yoshida, Naoyuki; and Furukawa, Yoshito, 4,673,529, Cl. 252-299.630.

Oguchi, Yoshihiro: *See*—
Katagiri, Kazuhara; Oguchi, Yoshihiro; Ohtake, Takeshi; Arao, Kozo; Kitahara, Makoto; and Takasu, Yoshio, 4,673,630, Cl. 430-72.000.

Ogura, Ichiro: *See*—
Asahina, Hiroshi; and Ogura, Ichiro, 4,674,108, Cl. 378-99.000.

Oguri, Shigenori: *See*—
Sugiyama, Jun; Suzuki, Akira; Terada, Kosei; Oguri, Shigenori; and Ishii, Shigeki, 4,672,876, Cl. 84-1.030.

Ohara, Tsunemasa: *See*—
Suzuki, Masayuki; Ohara, Tsunemasa; Tosaka, Yoichi; Kobayashi, Ryuichi; Harada, Yoshihito; and Kawamura, Masaharu, 4,673,272, Cl. 354-173.110.

Ohashi, Naohito: *See*—
Ishizumi, Kikuo; Ohashi, Naohito; Tanno, Norihiko; Sato, Hiromi; Fukui, Masaru; and Morisada, Shinya, 4,673,668, Cl. 514-34.000.

Ohbayashi, Yasuo: *See*—
Uchiyama, Soichi; Hayasaka, Toshiaki; and Ohbayashi, Yasuo, 4,673,693, Cl. 518-713.000.

Ohhara, Minoru: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,673,669, Cl. 514-42.000.

Ohhashi, Kunimi, to Canon Kabushiki Kaisha. Ultrasonic wave cleaning apparatus and method. 4,672,984, Cl. 134-56.00R.

Ohio Grain Company, The: *See*—
D'Aiello, Frank J., Jr., 4,673,576, Cl. 426-2.000.

Ohishi, Chikashi: *See*—
Kunichika, Kenji; Kagawa, Yoshikatsu; Ohishi, Chikashi; Nakao, Sho; and Asao, Yasuzi, 4,673,627, Cl. 430-49.000.

Ohmae, Kenichi; Tateisi, Kazuma; Shinohara, Yoshitsugu; and Ueno, Nobuyuki, to Omron Tateisi Electronics Co. System for making payments for transactions. 4,673,802, Cl. 235-379.000.

Ohmiya, Shigeru: *See*—
Nakato, Hakaru; Nozaki, Tsutomu; Kinoshita, Katsuo; Habu, Yasuhiro; Ohnuma, Hiroaki; Ohmiya, Shigeru; and Kimura, Tomoaki, 4,673,024, Cl. 164-431.000.

Ohmura, Hiroshi: *See*—
Yoshida, Shozo; and Ohmura, Hiroshi, 4,673,276, Cl. 354-430.000.

Ohmura, Tadayoshi: *See*—
Kawata, Hiroitsu; Aruga, Masayoshi; Ohmura, Tadayoshi; Sonobe, Takashi; Yoneya, Satoru; and Sone, Chiharu, 4,673,564, Cl. 424-494.000.

Ohmura, Yoshio: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,673,669, Cl. 514-42.000.

Ohnuki, Kazushi: *See*—
Yoshizawa, Kenji; Komura, Hirotsugu; Kodama, Hitoshi; Ohnuki, Kazushi; Shoda, Isao; Magome, Kazuo; and Ito, Hiroshi, 4,673,846, Cl. 315-248.000.

Ohnuma, Hiroaki: *See*—
Nakato, Hakaru; Nozaki, Tsutomu; Kinoshita, Katsuo; Habu, Yasuhiro; Ohnuma, Hiroaki; Ohmiya, Shigeru; and Kimura, Tomoaki, 4,673,024, Cl. 164-431.000.

Ohshima, Ken: *See*—
Okumura, Masuo; and Ohshima, Ken, 4,674,071, Cl. 369-48.000.

Ohshita, Youichi: *See*—
Setoyama, Eiji; Arimatsu, Keiji; and Ohshita, Youichi, 4,673,482, Cl. 204-298.000.

Ohta, Toshihiko: *See*—
Endoh, Seiji; Kimura, Kunio; Ohta, Toshihiko; and Kato, Yasuo, 4,673,724, Cl. 528-206.000.

Ohtake, Takeshi: *See*—
Katagiri, Kazuhara; Oguchi, Yoshihiro; Ohtake, Takeshi; Arao, Kozo; Kitahara, Makoto; and Takasu, Yoshio, 4,673,630, Cl. 430-72.000.

Ohtomo, Hideo: *See*—
Kuwata, Tamotsu; Suginaka, Yutaka; and Ohtomo, Hideo, 4,673,583, Cl. 426-573.000.

Ohya, Toshikazu: *See*—
Kumasaka, Toru; Kamiji, Koichi; and Ohya, Toshikazu, 4,673,912, Cl. 340-52.00R.

Ohzono, Kohei; Saito, Mitsuru; Hayashi, Kiyotaka; and Fujita, Taiji, to Honda Giken Kogyo Kabushiki Kaisha. Infinitely variable transmission. 4,673,379, Cl. 474-28.000.

Okada, Hideaki: *See*—
Yamaoka, Kojiro; and Okada, Hideaki, 4,673,055, Cl. 180-336.000.

Okada, Kunio, to Canon Kabushiki Kaisha. Printer having control means for stopping the printing operation thereof and inhibiting data output from memory. 4,673,990, Cl. 358-296.000.

Okada, Yukiyoshi: *See*—
Obata, Keigo; Dohi, Nobuyasu; Okuhama, Yoshiaki; Masaki, Seishi; Okada, Yukiyoshi; and Yoshimoto, Masakazu, 4,673,470, Cl. 204-44.400.

Okajima, Satoru: *See*—
Yamanishi, Kazuhiko; Shintani, Akinori; Okajima, Satoru; and Hanada, Toshiro, 4,673,635, Cl. 435-10.000.

Okamoto, Kenji: *See*—
Nishiwaki, Yoshikazu; Matsuoka, Shunji; and Okamoto, Kenji, 4,673,241, Cl. 350-3.640.

Okamura, Hisashi; Kawamoto, Hiroshi; and Shiraishi, Hisashi, to Fuji Photo Film Co., Ltd. Hardening method for gelatin. 4,673,632, Cl. 430-510.000.

Okamura, Masayoshi; Matsuda, Kiyoshi; Yamada, Hiromichi; Umeda, Hiromi; and Tomimoto, Masami, to Kabushiki Kaisha Kobe Seiko Sho. Method of analyzing oxygen or nitrogen contained in titanium group metal or alloy thereof. 4,673,655, Cl. 436-75.000.

Okanuma, Tsuneo, to Ushio Denki Kabushiki Kaisha. DC discharge lamp. 4,673,843, Cl. 313-570.000.

Okazaki, Yasuko: *See*—
Fukui, Shosin; Shinjo, Masayoshi; Aoyama, Hirokazu; Okazaki, Yasuko; Enjo, Naonori; and Hayashi, Kazunori, 4,673,712, Cl. 526-253.000.

Okita, Tsutomu: *See*—
Hashimoto, Hiroshi; Okita, Tsutomu; and Hibino, Noburo, 4,673,590, Cl. 427-44.000.

Okuhama, Yoshiaki: *See*—
Obata, Keigo; Dohi, Nobuyasu; Okuhama, Yoshiaki; Masaki, Seishi; Okada, Yukiyoshi; and Yoshimoto, Masakazu, 4,673,470, Cl. 204-44.400.

Okumura Corporation: *See*—
Murakami, Susumu; and Honda, Hiroo, 4,673,218, Cl. 299-15.000.

Okumura, Katsuji, to Automax Kabushiki-Kaisha. Multiple robot control system using grid coordinate system for tracking and completing travel over a mapped region containing obstructions. 4,674,048, Cl. 364-424.000.

Okumura, Masuo; and Ohshima, Ken, to Olympus Optical Company Limited. Data recording area signal generating method and apparatus. 4,674,071, Cl. 369-48.000.

Okumura, Toshio: *See*—
Taniguchi, Masato; Nishio, Hisaharu; Kawamura, Mitsuyoshi; and Okumura, Toshio, 4,672,933, Cl. 123-270.000.

Oldach, Bernd: *See*—
Munning, Hans; Bock, Jurgen; Oldach, Bernd; Ladic, Josef; Rauert, Max-Otto; Emde, Hugo; Petzsch, Dietrich; and de Baan, Johannes J., 4,673,067, Cl. 188-299.000.

Oliver, James A. Holder for a hair dryer. 4,673,148, Cl. 248-293.000.

Oliver, William: *See—*
Ferguson, Harry D.; Lee, Kar-Kui; Oliver, William; Kwong, Fat-Cho; Young, Ronald; Hammell, Jim; Morrow, Keith; and Chaudhary, Rashid A., 4,673,920, Cl. 340-521.000.

Olympus Optical Company Limited: *See—*
Okumura, Masuo; and Ohshima, Ken, 4,674,071, Cl. 369-48.000.
Saka, Mitsugu, 4,674,072, Cl. 369-52.000.

Oman, Joel E.: *See—*
Scanlon, John F.; Sherman, William D.; and Oman, Joel E., 4,673,002, Cl. 138-149.000.

Omron Tateisi Electronics Co.: *See—*
Imai, Yoshikiyo; and Yasuoka, Yuji, 4,673,908, Cl. 335-79.000.
Mizuno, Masao, 4,674,069, Cl. 367-90.000.
Ohmae, Kenichi; Tateisi, Kazuma; Shinohara, Yoshitsugu; and Ueno, Nobuyuki, 4,673,802, Cl. 235-379.000.

Omya GmbH: *See—*
Barthelmess, Ulrich, 4,673,134, Cl. 241-57.000.

O'Neill, Mark J., to Entech, Inc. Solar energy collector having an improved thermal receiver. 4,672,949, Cl. 126-440.000.

Ono, Katsuhiro, to Kabushiki Kaisha Toshiba. Rotating anode x-ray tube device. 4,674,109, Cl. 378-130.000.

Ono, Shuichi; Aida, Satoru; and Hoshino, Kinshiro, to Japan Tobacco & Salt Public Corporation, The; and Sanjo Machine Works Ltd. Control method of stop waiting operation in collective packing machine. 4,672,796, Cl. 53-449.000.

Onorio, Gabriel: *See—*
Guarino, Nicholas; Onorio, Gabriel; and Ward, Billy W., 4,673,101, Cl. 220-335.000.

Ontario Die Company Limited: *See—*
Levene, Martin M.; and Lessard, William W., 4,672,870, Cl. 83-19.000.

Onufryk, Michael. Optical image deflector assembly and method for locating visually sensitive peripheral areas of an eye, and determining corrective prismatic eye glasses therefore. 4,673,263, Cl. 351-158.000.

Oomen, Gijsbert L., to N.V. Optische Industrie de Oude Delft. Measuring system for contactless measuring the distance between a predetermined point of an object surface and a reference level. 4,673,817, Cl. 250-561.000.

Oppelt, Werner: *See—*
Krehan, Peter; and Oppelt, Werner, 4,673,192, Cl. 280-668.000.

Orban Associates, Inc.: *See—*
Orban, Robert A., 4,674,122, Cl. 381-13.000.

Orban, Robert A., to Orban Associates, Inc. Encoding for the FMX companding system. 4,674,122, Cl. 381-13.000.

ORC Manufacturing Co., Ltd.: *See—*
Mochida, Yoshihiro; Adachi, Nobuo; and Shirahama, Ichiro, 4,673,294, Cl. 356-381.000.

Ordonez Olmos, Jose M., to Cibie Projecteurs. Device for fixing and adjusting the optical block of a lamp on a motor vehicle. 4,674,012, Cl. 362-61.000.

Orihashi, Tadaaki; Tsuji, Hiroshi; Ogawa, Kazuhiko; Hayashitani, Masao; Terada, Seiji; Miyagawa, Tsugio; and Isozaki, Hideo, to Jushitsuyu Taisaku Gijutsu Kenkyu Kumiai. Process for thermal cracking of residual oils. 4,673,486, Cl. 208-86.000.

Oroamerica, Inc.: *See—*
Grotto, Ferdinando, 4,672,724, Cl. 24-616.000.

Orrville Products, Inc.: *See—*
Craver, Richard D., 4,672,946, Cl. 126-77.000.

Orsolini, Piero; Mauvernay, Rolland-Yves; and Deghenghi, Romano, to Debiopharm, S.A. Microencapsulation by phase separation of water-soluble medicaments. 4,673,595, Cl. 427-213.320.

Ortiz, Angel L., Jr., to General Electric Company. Integrated robotic laser material processing and imaging system. 4,673,795, Cl. 219-121.00L.

Osawa, Hideyuki: *See—*
Yokoi, Tatsuhisa; Takeya, Eisaku; Hattori, Kyo; Abe, Kazuo; and Osawa, Hideyuki, 4,672,939, Cl. 123-568.000.

O'Shea, Geraldine M.: *See—*
Goosen, Mattheus F. A.; O'Shea, Geraldine M.; and Sun, Anthony M., 4,673,566, Cl. 424-19.000.

Oshima, Muneo: *See—*
Satoh, Ryohei; Oshima, Muneo; Tanaka, Minoru; Sakaguchi, Suguru; Murata, Akira; and Hirota, Kazuo, 4,673,772, Cl. 174-52.0FP.

Ostreicher, Eugene A.; Knight, Rodney A.; Fiore, Joseph V.; Emond, George T.; and Hou, Kenneth C., to Cuno Inc. Charge modified microporous membrane. 4,673,504, Cl. 210-500.220.

O'Sullivan, Denis: *See—*
Puresevic, Peter J.; Taylor, Julian D.; and O'Sullivan, Denis, 4,673,095, Cl. 215-220.000.

Ota, Keizo, to Shingu Shoko, Ltd. Apparatus for cutting grass. 4,672,798, Cl. 56-12.700.

Otis Engineering Corporation: *See—*
Merritt, David T., 4,673,036, Cl. 166-117.500.
Turner, William H.; and Slaughter, Ivan K., 4,673,041, Cl. 166-340.000.

Otsuka, Toru; and Motoyama, Tadashi, to Sony Corporation. Optical information reproducing apparatus with improved skew error control. 4,674,078, Cl. 369-44.000.

Otten, Josephus M., to Sentron v.o.f. Oxygen sensor. 4,672,971, Cl. 128-635.000.

Outboard Marine Corporation: *See—*
Gust, Daniel M., 4,673,359, Cl. 440-88.000.
Winston, John H., 4,673,023, Cl. 164-246.000.

Ovshinsky, Stanford R.; and Hudgens, Stephen J., to Energy Conversion Devices, Inc. Integrated circuit compatible thin film field effect transistor and method of making same. 4,673,957, Cl. 357-2.000.

Owens-Corning Fiberglas Corporation: *See—*
Boles, David M., 4,673,140, Cl. 242-54.00R.
Greene, Neil E.; Grubka, Lawrence J.; and Nyhart, Randall E., 4,673,428, Cl. 65-2.000.
Wells, James R.; Portfolio, Donald C.; and Beck, Richard B., 4,673,614, Cl. 428-285.000.

Owens, James P.; and Deck, Charles F., to BASF Corporation. Synthetic polyether thickeners and thickened aqueous systems containing them. 4,673,518, Cl. 252-75.000.

Owens, Omer O.: *See—*
Sommer, Harold Z.; Owens, Omer O.; and Miller, Jacob I., 4,673,745, Cl. 546-147.000.

Oy Lars Lundin Patent Ab: *See—*
Lundin, Lars, 4,673,497, Cl. 210-242.300.

Oyama, Minoru; and Kinugawa, Ryoji, to Alps Electric Co., Ltd. Display element attachment holder. 4,674,008, Cl. 361-417.000.

Ozaki, Yoshio; and Tsurumoto, Kazuo, to Mitsubishi Denki Kabushiki Kaisha. Power source for wire cut electrical discharge machining. 4,673,789, Cl. 219-69.00W.

Ozeki, Takeshi; and Tsubura, Shinichi, to Kabushiki Kaisha Toshiba. Method and apparatus for obtaining three dimensional tomographic images by interpolation of a plurality of projection slice data bind for obtaining projection data for a chosen slice. 4,674,046, Cl. 364-414.000.

PA Ang, Peter G.: *See—*
Ang, Peter G. P.; and Sammells, Anthony F., 4,673,473, Cl. 204-59.00R.

Pacific Bell: *See—*
Schembri, John J., 4,673,246, Cl. 350-96.220.

Pade, Bernard: *See—*
Badouard, Michel; Durame, Claude; and Pade, Bernard, 4,673,085, Cl. 206-459.000.

Pagot, Henry, to Bendix France. Abutment key for the valve plunger of a braking assistance servomotor, and a servomotor equipped with such a key. 4,672,882, Cl. 91-369.00A.

Paice, Derek A.; and Edwards, Charles W., to Westinghouse Electric Corp. High voltage modular inverter and control system thereof. 4,674,024, Cl. 363-71.000.

Pajes, Chajkiel, to AB Asea-Atom. Sealing member for a connection piece or a similar connection part for a conduit for liquid or gas on a container. 4,673,001, Cl. 138-93.000.

Pako Corporation: *See—*
Sannel, Benjamin H., 4,673,251, Cl. 354-322.000.

Pandak, Zoltan I.: *See—*
Wigner, Lauren R.; and Pandak, Zoltan I., 4,673,542, Cl. 264-46.700.

Panicker, Narayana N.: *See—*
Baugh, Benton F.; and Panicker, Narayana N., 4,673,313, Cl. 405-195.000.

Panzer, Jack S. Sexual aid. 4,672,954, Cl. 128-79.000.

Panzer, Werner: *See—*
Babsch, Alfred; Beth, Dieter; Panzer, Werner; and Stempfle, Johann, 4,673,810, Cl. 250-231.0SE.

Papa, Alyce J.: *See—*
Small, Leonard E.; Garrison, Paul H., Jr.; Winkler, William M.; Seaman, Sharon A.; and Papa, Alyce J., 4,673,525, Cl. 252-132.000.

Papanide, Adrian T.: *See—*
Gartland, Thomas J.; and Papanide, Adrian T., 4,673,792, Cl. 219-74.000.

Papantoniou, Christos: *See—*
Mahieu, Claude; and Papantoniou, Christos, 4,673,571, Cl. 424-70.000.

Papst-Motoren GmbH & Co. KG: *See—*
Wrobel, Guenter, 4,673,834, Cl. 310-71.000.

Paramount Packaging: *See—*
Mammarella, James J., Sr., 4,672,893, Cl. 101-170.000.

Parfomak, Walter: *See—*
Sears, Jerome; Parfomak, Walter; and Kluss, Walter, 4,673,849, Cl. 318-272.000.

Parish, Bruce A. Riding mower side guard. 4,672,799, Cl. 56-17.400.

Parker, Donald L., to General Motors Corporation. Push rod to pedal arm connection. 4,672,860, Cl. 74-512.000.

Parker, Donald L.: *See—*
Haerr, Timothy A.; and Parker, Donald L., 4,673,000, Cl. 137-860.000.

Paslean, James H.; and Steele, Charles S., to Texaco Inc. Decolorizing ethanolamines with alkylene oxides. 4,673,762, Cl. 564-497.000.

Patel, Mansukh M., to Wm. Wrigley Jr. Company. Shellac encapsulant for high-potency sweeteners in chewing gum. 4,673,577, Cl. 426-5.000.

Patel, Raj L.: *See—*
Casteen, Lynn A.; Gilbert, Kim T.; Patel, Raj L.; and Snoke, Steven R., 4,673,546, Cl. 376-289.000.

Patoflex Corporation: *See—*
Ehrlich, Johann, 4,672,754, Cl. 36-85.000.

Patt, William C.: *See—*
Hamilton, Harriet W.; Patt, William C.; and Trivedi, Bharat K., 4,673,670, Cl. 514-46.000.

Pattle, David W.: *See—*
Withers, Christopher J.; and Pattle, David W., 4,673,434, Cl. 75-61.000.

Patton, Gail Y.; and Torgerson, Darrel D., to United States of America, Air Force. Alignment reference device. 4,674,011, Cl. 362-32.000.

Patton, Wesley H.; and Thompson, Jeffrey L., to Southern Railway Company. Electronic cross-level detection system. 4,673,854, Cl. 318-649.000.

Paule, Kurt: *See*—
Hornung, Friedrich; Paule, Kurt; and Schadlich, Fritz, 4,673,318, Cl. 408-9.000.

Paulsen, Dean R., to General Scanning, Inc. Two-element angular positive sensor for rotatable shaft. 4,673,876, Cl. 324-208.000.

Pedrazzi, Reinhard: *See*—
Moser, Helmut; Greve, Manfred; Pedrazzi, Reinhard; and Wald, Roland, 4,673,735, Cl. 534-606.000.

Peinemann, Klaus-Viktor, to GKSS Forschungszentrum GmbH. Method for producing an integral, asymmetric membrane and the resultant membrane. 4,673,418, Cl. 55-158.000.

Pelger, Michael: *See*—
Henne, Werner; and Pelger, Michael, 4,673,506, Cl. 210-636.000.

Pelz, Edward C., to Navistar International Corporation. Twist clip. 4,673,151, Cl. 248-74.100.

Pendleton, Robert G. α_2-adrenergic receptor antagonists as modifiers of gastrointestinal motility. 4,673,680, Cl. 514-285.000.

Pengler, Rudolf. Exercising device. 4,673,179, Cl. 272-93.000.

Peninsula Plastics Co., Inc.: *See*—
Webb, Daniel D., 4,673,087, Cl. 206-600.000.

Peppel, Michael; and Salzmann, Theodor, to Siemens Aktiengesellschaft. Method and apparatus for recognizing the cutoff state of a thyristor which can be switched off. 4,674,023, Cl. 363-57.000.

Pepper, Steven H., to Tektronix, Inc. Power supply switch circuit. 4,673,824, Cl. 307-64.000.

Peppers, James M., to Unislip, Inc. Valve seat grinding apparatus. 4,672,786, Cl. 51-241.0VS.

Perazzolo, Guiseppe. Pair of tailoring set-squares for sketching the component parts of clothing especially for constructing garments of any size or model. 4,672,748, Cl. 33-11.000.

Percec, Elena S.; and Li, George S., to Standard Oil Company. Process for the modification of aromatic polymers via Friedel-Crafts reactions to produce novel polymers and the use thereof. 4,673,717, Cl. 525-390.000.

Perche, Herve. Machine for gathering oysters. 4,672,756, Cl. 37-55.000.

Perciful, David D., to Barr, J. T.; and Doty, Keith. Power driven roofing removal tool. 4,673,219, Cl. 299-39.000.

Perelman, Franklin M.: *See*—
Nelson, John E.; Grossheim, Edward T.; and Perelman, Franklin M., 4,673,929, Cl. 340-703.000.

Peter, Cornelius; and Ruppmann, Claus, to Robert Bosch GmbH. Method and apparatus for adapting the characteristic of a final controlling element. 4,672,934, Cl. 123-339.000.

Peters, Kenneth D.: *See*—
Turner, Robert B.; Peters, Kenneth D.; and Bennett, Richard W., 4,673,488, Cl. 208-101.000.

Peters, Rex B.: *See*—
Hulsing, Rand H., II; Peters, Rex B.; and Steinke, Kurt E., 4,672,752, Cl. 33-302.000.

Petrow, William M., to Zenith Electronics Corporation. CRT deflection yoke with rigidifying means. 4,673,906, Cl. 335-210.000.

Petzsch, Dietrich: *See*—
Munning, Hans; Bock, Jurgen; Oldach, Bernd; Ladic, Josef; Rauert, Max-Otto; Emde, Hugo; Petzsch, Dietrich; and de Baan, Johannes J., 4,673,067, Cl. 188-299.000.

Peyroux, Jean S.: *See*—
Precoul, Michel; and Peyroux, Jean S., 4,672,896, Cl. 102-309.000.

Pfeifer & Langen: *See*—
Schwengers, Dieter, 4,673,643, Cl. 435-97.000.

Pfeil, Leonard B., to Inco Limited. Method for the production of nickel powder. 4,673,430, Cl. 75-0.5AA.

Pfizer Inc.: *See*—
LaMattina, John L., 4,673,677, Cl. 514-272.000.

Phelps, Collin J.: *See*—
Carroll, Noel; and Phelps, Collin J., 4,673,495, Cl. 210-232.000.

Phillips, Ian R.; Lodge, Robert H.; and Bunyan, Glen W., to N. J. Phillips Pty. Limited. Pellet injector. 4,673,387, Cl. 604-62.000.

Phillips, Ian R., to N.J. Phillips Pty. Limited. Dual barrel injector. 4,673,395, Cl. 604-191.000.

Phillips Petroleum Company: *See*—
Michael, Richard W., 4,673,869, Cl. 324-61.00R.

Phillips, Robert A.; and Cassidy, Calvin A., to United States of America, Air Force. Situation awareness mode. 4,673,938, Cl. 342-95.000.

Pichon, Joseph, to Societe Anonyme Dite "l'Equipement Routier" . Cornice for bridge, viaduct, or the like. 4,672,781, Cl. 52-94.000.

Picker International Inc.: *See*—
Kerber, Michael M.; and Brunnett, Carl J., 4,674,045, Cl. 364-414.000.
Urban, Carol A.; and Morey, Mangala A., 4,674,107, Cl. 378-98.000.

Pickering, J. Larry: *See*—
Betts, William S., Jr.; Pickering, J. Larry; and Black, William E., 4,673,548, Cl. 376-362.000.

Piduch, Hans-Gunter: *See*—
Kwasuik, Hans-Jurgen; and Piduch, Hans-Gunter, 4,673,463, Cl. 201-41.000.

Pierburg GmbH & Co KG: *See*—
Hartig, Gunter, 4,672,928, Cl. 123-143.00B.

Pierre, Jacques: *See*—
Anzola, Michel; Lefevre, Daniel; Massicot, Patrick; Pierre, Jacques; and Henry, Antoine, 4,673,585, Cl. 427-6.000.

Pierrel SpA: *See*—
Toscano, Luciano, 4,673,736, Cl. 536-7.200.

Pilkington Brothers P.L.C.: *See*—
Jago, John J., 4,673,325, Cl. 414-103.000.

Pimlott, John R.: *See*—
Morris, Gregory J. E.; Grosshandler, Sandor; Beaver, Richard N.; Pimlott, John R.; and Dang, Hiep D., 4,673,479, Cl. 204-279.000.

Pink, Hans, to Siemens Aktiengesellschaft. Aerosol production in inductively coupled plasma emission spectroscopy. 4,673,656, Cl. 436-173.000.

Piper, Robert J.; and Homann, Helmut F. Antenna and method for fabricating same. 4,673,950, Cl. 343-912.000.

Pipkorn, Howard W. Boat hull with center V-hull and sponsons. 4,672,905, Cl. 114-56.000.

Pippert, Aaron J., to Utex Industries, Inc. Fishing lure. 4,672,768, Cl. 43-42.090.

Pisano, Alan D., to General Electric Company. Isochronous gas turbine speed control. 4,672,806, Cl. 60-39.030.

Pitney Bowes Inc.: *See*—
Sansone, Ronald P.; Cruz-Uribe, Antonio S.; and Chang, Mike S. H., 4,673,303, Cl. 400-126.000.

Plaatsman, Jacob: *See*—
Damman, Cornelis C.; and Plaatsman, Jacob, 4,673,016, Cl. 157-1.240.

Plakos, Drew: *See*—
Goldfarb, Adolph E.; Everitt, Delmar K.; and Plakos, Drew, 4,673,370, Cl. 446-162.000.

Plateau Products Corp.: *See*—
Chezem, Jimmie A., 4,673,203, Cl. 292-339.000.

Playtronics Corporation: *See*—
Bush, Vincent N., 4,673,368, Cl. 446-8.000.

Plessey Overseas Limited: *See*—
Dakin, John P., 4,673,299, Cl. 374-131.000.

Plumley, Wallace J.: *See*—
Caughman, Donald O.; and Plumley, Wallace J., 4,674,057, Cl. 364-513.000.

Pneumo Corporation: *See*—
Vanderlaan, Robert D.; and Meulendyk, John W., 4,672,992, Cl. 137-331.000.

Poggi, Tatjana: *See*—
Krakkay, Tibor; Poggi, Tatjana; and Schubert, Ernst, 4,673,721, Cl. 526-329.300.

Pohjonen, Jukka I.: *See*—
Halonen, Heino T. K.; and Pohjonen, Jukka I., 4,673,326, Cl. 414-286.000.

Pohl, Claus: *See*—
Fruth, Rupert; Stemmer, Gottfried; and Pohl, Claus, 4,673,815, Cl. 250-548.000.

Pohlar, Trent L. Wall framing system with an internal water deflector. 4,672,784, Cl. 52-235.000.

Pohndorf, Peter J., to Cordis Corporation. Suture sleeve assembly. 4,672,979, Cl. 128-784.000.

Polar Molecular Corporation: *See*—
Nelson, Otis L., Jr.; and Nelson, Mark L., 4,673,411, Cl. 44-53.000.

Polaroid Corporation: *See*—
Guerra, John M., 4,673,818, Cl. 250-571.000.

Poletta, Vanni: *See*—
Giorgetta, Valerio; Poletta, Vanni; Sartori, Mario; and Siligoni, Marco, 4,673,830, Cl. 307-297.000.

Poli Industria Chimica S.p.A.: *See*—
Poli, Stefano, 4,673,681, Cl. 514-288.000.

Poli, Stefano, to Poli Industria Chimica S.p.A. Pharmaceutical methods having dopaminergic activity. 4,673,681, Cl. 514-288.000.

Pollak, Elie: *See*—
Lewiner, Jacques; Charpak, Georges; and Pollak, Elie, 4,673,885, Cl. 324-457.000.

Pommer, Ernst-Heinrich: *See*—
Buschmann, Ernst; Schuster, Ludwig; Goetz, Norbert; Pommer, Ernst-Heinrich; and Ammermann, Eberhard, 4,673,683, Cl. 514-317.000.
Rieber, Norbert; Boehm, Heinrich; Pommer, Ernst-Heinrich; and Dressel, Juergen, 4,673,429, Cl. 71-27.000.

Poncy, George W., to Steridyne Corporation. Antidecubitis cushion. 4,672,700, Cl. 5-441.000.

Popovic, Radivoje; Solt, Katalin; and Berchier, Jean-Luc, to LGZ Landis; and Gyr Zug AG. Buried Hall element. 4,673,964, Cl. 357-27.000.

Popovich, Robert P.; and Moncrief, Jack W. Peritoneal membrane plasmapheresis. 4,673,385, Cl. 604-28.000.

Poret, Mark; and McKinley, Jeanne, to Intel Corporation. In-circuit emulator. 4,674,089, Cl. 371-25.000.

Porter, Vernon R.; and Baber, Samuel C., to Texas Instruments Incorporated. Metal planarization process. 4,673,592, Cl. 427-53.100.

Portfolio, Donald C.: *See*—
Wells, James R.; Portfolio, Donald C.; and Beck, Richard B., 4,673,614, Cl. 428-285.000.

Portinari, Antonio, to Societa' Cavi Pirelli S.p.A. Process and apparatus for manufacturing a core provided with open helical grooves for receiving optical fibers. 4,673,540, Cl. 264-1.500.

Postlewait, Lester B.: *See*—
Wilhelmson, Jack L.; and Postlewait, Lester B., 4,673,300, Cl. 374-182.000.

Potter, William D.; Kiamil, Sinan B.; and White, Nicholas D., to Smith and Nephew Associated Companies p.l.c. Bandages, components thereof and use. 4,672,956, Cl. 128-90.000.

Potvin, David E.: *See*—
Gabriel, Paul K.; Potvin, David E.; and Potvin, James R., 4,674,030, Cl. 364-184.000.

Potvin, James R.: *See*—
Gabriel, Paul K.; Potvin, David E.; and Potvin, James R., 4,674,030, Cl. 364-184.000.

Pouey, Michel, to Centre National de la Recherche Scientifique. Monochromator with a telecentric dispersive lens. 4,673,292, Cl. 356-334.000.

Powell, Jonathan S., Jr. Process for chlorination of swimming pools. 4,673,513, Cl. 210-756.000.

Powell, Walter W., to Anderson-Greenwood USA, Inc. Redundant pilot valve control system. 4,672,995, Cl. 137-489.000.

Pozniak, Donald J., to General Motors Corporation. Peak combustion pressure timing detector for IC engine using intake valve deformation. 4,672,843, Cl. 73-117.300.

Precoul, Michel; and Peyroux, Jean S., to Societe d'Etudes, de Realisations et d'Applications Techniques. Hollow charges. 4,672,896, Cl. 102-309.000.

Premerlani, William J., to General Electric Company. Apparatus and method to increase dynamic range of digital measurements. 4,674,062, Cl. 364-602.000.

Prestele, Erich; Schneider, Alfred; Hepperle, Willi; Katzer, Johann; Stephany, Christian; and Lopic, Franz, to Gardena Kress & Kastner GmbH. Washing brush with adjustable head. 4,673,307, Cl. 401-289.000.

Prietzel, Gunter: *See*—
Bohnen, Peter; Prietzel, Gunter; and Kugler, Reinhard, 4,673,779, Cl. 200-146.00R.

Prieve, Kathryn A.: *See*—
Marrs, Gevan R.; and Prieve, Kathryn A., 4,672,856, Cl. 73-863.520.

Pritchatt, Robert J., to Naylor Bros. (Clayware) Limited. Sewer pipes. 4,673,198, Cl. 285-292.000.

Pritchett, Gregory M.: *See*—
Hanson, Larry K.; and Pritchett, Gregory M., 4,673,187, Cl. 277-26.000.

Procter & Gamble Company, The: *See*—
Small, Leonard E.; Garrison, Paul H., Jr.; Winkler, William M.; Seaman, Sharon A.; and Papa, Alyce J., 4,673,525, Cl. 252-132.000.
Weisman, Paul T.; Houghton, Dawn I.; and Gellert, Dale A., 4,673,402, Cl. 604-368.000.

Production Monitoring and Control Co.: *See*—
Hirsch, Michael; Kristensen, Peter D.; and Dunn, William W., 4,672,845, Cl. 73-151.000.

Proflek, Inc.: *See*—
May, Robert H.; and Burgoyne, Robert A., 4,672,959, Cl. 128-136.000.

Provost, George A., to Actief N.V. ABN Trust Company (Curacao) N.V. Strip fastener material. 4,672,721, Cl. 24-442.000.

Pruett, Earl M., to Bertucci, Enrico, a part interest. Disposable injection transmitter. 4,673,399, Cl. 604-272.000.

Prufer, James M.: *See*—
Prufer, Max H.; and Prufer, James M., 4,673,010, Cl. 141-382.000.

Prufer, Max H.; and Prufer, James M. Internal expansion waterbed fitting. 4,673,010, Cl. 141-382.000.

Puhler, Alfred; Wolleben, Wolfgang; and Leineweber, Michael, to Hoechst Aktiengesellschaft. Plasmid P SVH 1 and its use. 4,673,642, Cl. 435-91.000.

Pujol, Serge: *See*—
Benoit, Alain D.; and Pujol, Serge, 4,672,823, Cl. 62-514.00R.

Pungor, Erno; Toth, Klara S.; Feher, Zsofia; Nagy, Geza; and Horvai, Gyorgy, to Richter Gedeon Vegyeszeti Gyar; and Budapesti Muszaki Eg.,tem. Method and an apparatus for performing routine analyses such as polarographic or spectrophotometric analysis. 4,673,295, Cl. 356-440.000.

Puresevic, Peter J.; Taylor, Julian D.; and O'Sullivan, Denis. Closure device for containers. 4,673,095, Cl. 215-220.000.

Qi, Cai B.: *See*—
Ramalingam, Subbiah; Qi, Cai B.; and Kim, Kyunghoon, 4,673,477, Cl. 204-192.380.

Quaglino, Angelo V., Jr. Compression retaining piston. 4,672,921, Cl. 123-41.380.

Quine, John P.: *See*—
Jespersen, Nils V.; and Quine, John P., 4,673,899, Cl. 333-137.000.

Quintana, Carlos A.: *See*—
Aubert, James H.; Clough, Roger L.; Curro, John G.; Quintana, Carlos A.; Russick, Edward M.; and Shaw, Montgomery T., 4,673,695, Cl. 521-64.000.

Quirante, Carmelo G.: *See*—
Wells, John R.; and Quirante, Carmelo G., 4,673,501, Cl. 210-406.000.

R. R. Donnelley & Sons Company: *See*—
Wong, Did-Bun; and Lubenow, Josef K., 4,674,052, Cl. 364-466.000.

Raasch, Hans, to W. Schlafhorst & Co. Method and device for starting the spinning of a thread in an OE-spinning device. 4,672,802, Cl. 57-263.000.

Rabuse, George R.: *See*—
Hanson, Gary R.; and Rabuse, George R., 4,673,324, Cl. 412-6.000.

Rachels Industries, Inc.: *See*—
Dayus, Lloyd G., 4,672,890, Cl. 98-114.000.

Rackin, Mark H., to Solid State Systems, Inc. Time division multiplexed switching structure for PBX. 4,674,083, Cl. 370-67.000.

Raddi, William J.; Johnson, Robert W., Jr.; Tracy, John G.; and Sonnenberg, Blazej W., to Exide Electronics Corporation. Uninterruptible power supply with isolated bypass winding. 4,673,825, Cl. 307-66.000.

Raff, Donald K., to Stepan Company. Deresination method of wood pulp. 4,673,460, Cl. 162-75.000.

Rafi-Zadeh, Hassan. Cover assembly for pickup truck bed. 4,673,209, Cl. 296-100.000.

Raid, Larry J.: *See*—
Hilty, Calvin A.; and Raid, Larry J., 4,673,153, Cl. 248-231.800.

Raj, Kuldip: *See*—
Gowda, Hanumaiah L.; Raj, Kuldip; and Borduz, Lucian, 4,673,997, Cl. 360-107.000.

Ram-Line, Inc.: *See*—
Chesnut, M. Gaines; and Castetter, Thomas L., 4,672,760, Cl. 42-50.000.

Ramalingam, Subbiah; Qi, Cai B.; and Kim, Kyunghoon, to University of Minnesota, Regents of the. Controlled vacuum arc material deposition, method and apparatus. 4,673,477, Cl. 204-192.380.

Ramamurthy, Ramalinga: *See*—
Nieskens, Martin J. P. C.; and Ramamurthy, Ramalinga, 4,673,557, Cl. 423-230.000.

Ramspacher, Robert J.; and Butcher, Charles, to RCA Corporation. Method of fixedly attaching a component to a base member. 4,672,732, Cl. 29-429.000.

Ranford, Alan B.: *See*—
Flynn, Daniel P.; and Ranford, Alan B., 4,673,161, Cl. 251-10.000.

Range, Kenneth A. Combination trash can and vacuum cleaner attachment. 4,673,424, Cl. 55-356.000.

Rasmussen, Villum B. K., to V. Kann Rasmussen & Co. Window to be used as a skylight or a front window. 4,672,774, Cl. 49-371.000.

Rast, Gustaf J., Jr.: *See*—
Barley, Thomas A.; Hodgens, Tony D.; and Rast, Gustaf J., Jr., 4,673,940, Cl. 342-192.000.

Ratcom, Inc.: *See*—
Thomas, Richard A.; and Eggleston, Ross W., 4,673,288, Cl. 356-72.000.

Rauert, Max-Otto: *See*—
Munning, Hans; Bock, Jurgen; Oldach, Bernd; Ladic, Josef; Rauert, Max-Otto; Emde, Hugo; Petzsch, Dietrich; and de Baan, Johannes J., 4,673,067, Cl. 188-299.000.

Ravichandran, Ramanathan; and Snead, Thomas E., to Ciba-Geigy Corporation. Amide substituted benzylhydroxylamines and stabilized polyolefin compositions. 4,673,700, Cl. 524-96.000.

Rawle, Ralph H., to J. P. Tool Limited. Cross-feed facing head. 4,672,868, Cl. 82-2.00E.

Raychem Corporation: *See*—
Leary, David F.; and Brigham, Alan, 4,673,801, Cl. 219-544.000.

Raymond Production Systems Corporation: *See*—
Bartylla, James G., 4,673,080, Cl. 198-689.100.

RCA Corporation: *See*—
Carlson, Curtis R.; Arbeiter, James H.; and Bessler, Roger F., 4,674,125, Cl. 382-49.000.
Dischert, Robert A.; Topper, Robert J.; and Shyu, William M., 4,673,978, Cl. 358-140.000.
Ramspacher, Robert J.; and Butcher, Charles, 4,672,732, Cl. 29-429.000.

Redfield, William H.: *See*—
Lewandowski, Raymond F.; Doros, Jacek P.; and Redfield, William H., 4,673,778, Cl. 200-67.00B.

Redmond, Kevin P., to Advanced Systems Research, Inc. Wide band quadrature hybrid. 4,673,898, Cl. 333-109.000.

Reeves Brothers, Inc.: *See*—
Awdhan, Deo P., 4,673,452, Cl. 156-254.000.

Regev, Mordechai: *See*—
Assaf, Gad; and Regev, Mordechai, 4,672,950, Cl. 126-452.000.

Reh, Kim R., to General Dynamics, Pomona Division. Bearing friction tester. 4,672,838, Cl. 73-9.000.

Reich, Charles: *See*—
Dee, Robert N.; and Reich, Charles, 4,672,964, Cl. 128-305.000.

Reilly, Frederick W., to Miranda Investments Limited. Hinge mechanism for use with folding structures. 4,673,308, Cl. 403-172.000.

Reis, Mario J. J. M. P. D.; and Couper, John, to Burroughs Corporation. Equipment enclosure fastening means. 4,673,100, Cl. 220-324.000.

Remmel, Hans: *See*—
Schwarze, Werner; Wolff, Siegfried; Remmel, Hans; and Lambertz, Horst, 4,673,741, Cl. 544-209.000.

Remy, Joel, to Adret Electronique. Frequency synthesizer having first phase locked loop frequency multiplied by near unity in second phase locked loop. 4,673,891, Cl. 331-2.000.

Renbec International Corporation: *See*—
Frankel, Alfred R., 4,672,960, Cl. 128-200.260.

Renfrew, Bruce, to Hozelock-ASL Limited. Hose coupling. 4,673,199, Cl. 285-316.000.

Reparaz, Adolfo: *See*—
Cooke, William R.; Haugen, Brian G.; and Reparaz, Adolfo, 4,673,545, Cl. 376-261.000.

Reppen, Gyora, to Tadiran Israel Electronics Industries Ltd. RF power switches. 4,673,831, Cl. 307-300.000.

Research Association for Petroleum Alternatives Development: *See*—
Uchiyama, Soichi; Hayasaka, Toshiaki; and Ohbayashi, Yasuo, 4,673,693, Cl. 518-713.000.

Research Development, Corporation of Japan: *See*—
Nishizawa, Jun-ichi; and Kondoh, Hisao, 4,673,961, Cl. 357-22.000.

Restrepo, Mario A.: *See*—
Aranguren, William L.; Restrepo, Mario A.; and Sidey, Michael J., 4,674,085, Cl. 370-85.000.

Retallick, William B., to Camet, Inc. Metal honeycomb catalyst support having a double taper. 4,673,553, Cl. 422-180.000.

Retallick, William B.: *See*—
Cornelison, Richard C.; and Retallick, William B., 4,672,809, Cl. 60-286.000.

Revlon, Inc.: *See*—
Ekchian, Jack A.; Hoffman, Robert W.; Ekchian, Leon; and Gabriel, Kaigham J., 4,673,932, Cl. 340-825.540.
Hofke, Fred, 4,672,973, Cl. 128-665.000.

Reynolds, David P.; Shepard, John D.; and Stone, Samuel L., Jr., to Collins & Aikman. One-piece automotive trunk liner. 4,673,207, Cl. 296-39.00R.

Reynolds Metals Company: *See*—
Tabereaux, Alton T.; and Gunnip, Frank L., 4,673,478, Cl. 204-243.00R.

Rheinische Maschinenfabrik Eisengiesserei Anton & Poper GmbH & Co.: *See*—
Mitzner, Horst, 4,673,022, Cl. 164-201.000.

Rhone-Poulenc Specialites Chimiques: *See*—
Magnier, Claude, 4,673,663, Cl. 502-320.000.

Rice, Max, to Max Rice Corporation, The. Torso building exercise machine. 4,673,180, Cl. 272-146.000.

Rich, Gregory E.: *See*—
Giacomazzi, Roy A.; and Rich, Gregory E., 4,673,009, Cl. 141-198.000.

Richardson, Paul F.; and Bhattacharyya, Bhupati R., to Nalco Chemical Company. Acrylamide diallyl dimethyl ammonium chloride copolymers as improved dewatering acids for mineral processing. 4,673,511, Cl. 210-734.000.

Richter Gedeon Vegyeszeti Gyar: *See*—
Pungor, Erno; Toth, Klara S.; Feher, Zsofia; Nagy, Geza; and Horvai, Gyorgy, 4,673,295, Cl. 356-440.000.

Richter, Georg-Gerd; and Krautz, Alfons O. Smokestack or tower of precast reinforced concrete modules. 4,672,782, Cl. 52-218.000.

Rickle, Gregory K., to Dow Chemical Company, The. Nonreactive class of surfactants for foaming agents in plastics. 4,673,755, Cl. 556-489.000.

Rickus, Edmund, to Nestle & Fischer. Laser-optical surveying system. 4,673,287, Cl. 356-4.000.

Ricoh Company, Ltd.: *See*—
Ameyama, Minoru; Isayama, Takuro; Yamazaki, Hiroshi; Matsumoto, Shuzo; Katano, Yasuo; and Iwasaki, Kyuhachiro, 4,673,955, Cl. 346-140.00R.
Kawamura, Atsushi, 4,673,259, Cl. 350-465.000.
Matsumoto, Fuyuhiko; and Tsushima, Shuuichi, 4,673,284, Cl. 355-15.000.

Ridder, Sven-Olof: *See*—
Unden, Harald; and Ridder, Sven-Olof, 4,673,606, Cl. 428-138.000.

Rieben, Stuart L.; and Wylie, Mark E., to Westinghouse Electric Corp. Apparatus for applying an end plug to an end of a fuel rod tube. 4,672,791, Cl. 53-327.000.

Rieber, Norbert; Boehm, Heinrich; Pommer, Ernst-Heinrich; and Dressel, Juergen, to BASF Aktiengesellschaft. Nitrification-inhibiting 1-hydroxypyrazole derivatives. 4,673,429, Cl. 71-27.000.

Riedweg, Robert: *See*—
Schlensog, Klaus; Beer, Christian; and Riedweg, Robert, 4,673,388, Cl. 604-74.000.

Riera, Frank J.; and Thorn, Brent A. Automatic fastener system with fastener detection means. 4,672,866, Cl. 81-57.370.

Ries, Gunther; and Heinzelmann, Karl-Georg, to Siemens Aktiengesellschaft. Magnetic apparatus of a nuclear spin tomography system with an approximately hollow-cylindrical shielding device. 4,673,881, Cl. 324-318.000.

Rieser, Udo. Rollable knife sharpener. 4,672,778, Cl. 51-354.000.

Rikis, Vitolds: *See*—
Schiff, Otto M.; and Rikis, Vitolds, 4,673,269, Cl. 354-76.000.

Riley, Eric K.; Dudill, Roger; and Young, Philip J., to Air Products and Chemicals, Inc. Heating apparatus. 4,673,348, Cl. 431-115.000.

Ritter, Gerhard: *See*—
Gott, Hans; Ritter, Josef; Ritter, Gerhard; and Ritter, Klaus, 4,673,786, Cl. 219-56.000.

Ritter, Josef: *See*—
Gott, Hans; Ritter, Josef; Ritter, Gerhard; and Ritter, Klaus, 4,673,786, Cl. 219-56.000.

Ritter, Klaus: *See*—
Gott, Hans; Ritter, Josef; Ritter, Gerhard; and Ritter, Klaus, 4,673,786, Cl. 219-56.000.

Roach, Michael J.: *See*—
Blamire, Michael F.; Briscoe, Peter F.; McLeod, Douglas D.; Doolittle, B. Kingsley; and Roach, Michael J., 4,673,900, Cl. 333-167.000.

Robba, Max F.; and Aurousseau, Michel E., to Innothera. 1-(2-pyridyl) 4-cycloalkylmethyl piperazines having cardiotropic activity. 4,673,675, Cl. 514-252.000.

Roberfroid, Marcel B.; Viehe, Heinz G.; and Hervens, Francoise M., to Biotec. Acylated enamides and pharmaceutical compositions containing them. 4,673,690, Cl. 514-563.000.

Robert Bosch GmbH: *See*—
Hornung, Friedrich; Paule, Kurt; and Schadlich, Fritz, 4,673,318, Cl. 408-9.000.
Leonhard, Rolf; and Dettling, Hubert, 4,672,808, Cl. 60-286.000.
Peter, Cornelius; and Ruppmann, Claus, 4,672,934, Cl. 123-339.000.

Roberts, Peter; and Chung, Sydney, to G Enterprises Limited. High performance automotive muffler. 4,673,058, Cl. 181-266.000.

Roberts, Thomas G.; and Honeycutt, Thomas E., to United States of America, Army. CO_2 laser weapon countermeasure. 4,673,250, Cl. 350-320.000.

Roberts, William, to Uddeholm Tooling Aktiebolag. Low-alloy steel material, die blocks and other heavy forgings made thereof and a method to manufacture the material. 4,673,433, Cl. 75-53.000.

Robillard, Fred W. System for freeze protection of pipes. 4,672,990, Cl. 137-59.000.

Robinson Brothers Limited: *See*—
Rock, Kenneth; and Smith, Geoffrey, 4,673,748, Cl. 548-237.000.

Robinson, Hugh A., to Andrew Wilson Company. Sliding file support for a dual access filing system. 4,673,091, Cl. 211-184.000.

Rock, John A.; Durfee, Norman E., Jr.; and Johnson, Robert O., to General Electric Company. Impact modified polyetherimide-polycarbonate blends. 4,673,708, Cl. 525-66.000.

Rock, Kenneth; and Smith, Geoffrey, to Robinson Brothers Limited. Process for preparing 2-oxazolines utilizing stannous salts of carboxylic acids. 4,673,748, Cl. 548-237.000.

Rockwell International Corporation: *See*—
Solomonides, Byron C., 4,673,147, Cl. 244-122.00A.

Rodriguez, Saulo, to Lisle Corporation. Flexplate turning tool. 4,672,867, Cl. 81-176.100.

Roelofs, Darrell D.: *See*—
Louie, Chuen W.; Roelofs, Darrell D.; Volk, John L.; and Romeo, Arthur L., 4,673,847, Cl. 315-368.000.

Roerig, Arnold J.; and Shockley, Steven C., to Beloit Corporation. Enclosed shoe press with flexible end connections for its annular belt. 4,673,461, Cl. 162-205.000.

Rogers, Robert G., to California Microwave, Incorporated. Oscillator coupled through cylindrical cavity for generating low noise microwaves. 4,673,894, Cl. 331-96.000.

Rogers, Roger W.: *See*—
Brelsford, David P.; Cerutti, Daniel D.; Coleman, Leslie S.; Davison, Gerald A.; Dewey, Pamela H.; Enichen, Margaret C.; Hartley, Sarah T.; Malinowski, Paul A.; Rogers, Roger W.; Tallman, Peter H.; and Czak, Lynn A., 4,674,038, Cl. 364-200.000.

Rogers, Wade T.: *See*—
Jansson, Peter A.; Rogers, Wade T.; and Schwaber, James S., 4,673,988, Cl. 358-280.000.

Rohm GmbH: *See*—
Siegert, Hermann; and Ude, Werner, 4,673,730, Cl. 528-491.000.

Rohr, Franz, to Siemens Aktiengesellschaft. Pushing device for sliding fuel rods out of a nuclear reactor fuel assembly. 4,673,544, Cl. 376-261.000.

Rohr, Wolfgang: *See*—
Hamprecht, Gerhard; Rohr, Wolfgang; and Varwig, Juergen, 4,673,740, Cl. 544-92.000.

Rokni, Mordechai; and Flusberg, Allen M., to Avco Corporation. Method of and apparatus for correction of laser beam phase front aberrations. 4,673,257, Cl. 350-354.000.

Roling, Paul V., to Betz Laboratories, Inc. Method for prevention of fouling in a basic solution by addition of specific nitrogen compounds. 4,673,489, Cl. 208-289.000.

Rollins, Richard: *See*—
Lynn, Kenneth M.; and Rollins, Richard, 4,673,397, Cl. 604-251.000.

Rolls-Royce Limited: *See*—
Brown, John D.; Gladdish, Peter; and McCormick, Michael A., 4,673,871, Cl. 324-76.00R.

Rolls-Royce plc: *See*—
Conolly, Ralph I., 4,673,124, Cl. 228-170.000.

Romania, Samuel R.: *See*—
Smith, Grant M.; Romania, Samuel R.; and Gibbs, Ronald T., 4,674,004, Cl. 361-384.000.

Romeo, Arthur L.: *See*—
Louie, Chuen W.; Roelofs, Darrell D.; Volk, John L.; and Romeo, Arthur L., 4,673,847, Cl. 315-368.000.

Ronic S.A.: *See*—
Machuron, Robert, 4,673,860, Cl. 318-812.000.

Rose, Thomas A., to Ecolotech, Inc. Sensing probe for sludge detectors. 4,673,819, Cl. 250-573.000.

Rose, William H.: *See*—
Gingerich, David J.; Granitz, Richard F.; Rose, William H.; and Shaffer, David T., 4,673,837, Cl. 310-239.000.

Rosell, Jorge E.; and Folch, Carlos M., to Bendiberica S.A. Rotary hydraulic distributor, particularly for an assisted steering mechanism. 4,672,884, Cl. 91-375.00R.

Rosenbaum, Walter S.: *See*—
Lange, Frederick R.; and Rosenbaum, Walter S., 4,674,065, Cl. 364-900.000.

Rosende, Francisco J. B. Solar radiation collector. 4,672,948, Cl. 126-438.000.

Roser, Erich: *See*—
Memminger, Gustav; and Roser, Erich, 4,673,139, Cl. 242-47.010.

Rosseel, Rik; Decock, Bernard; Wyffels, Marc; and Ampe, Frank, to N.V. Weefautomaten Picanol. Adjustable control of the weft on a weaving loom. 4,673,004, Cl. 139-435.000.

Roth, David W., to 2500 Corporation, The. Floor mat mounting system. 4,673,603, Cl. 428-85.000.

Roth, James E., to Intertherm Inc. Three-member plastic rooftop air conditioner housing. 4,672,818, Cl. 62-239.000.

Roth, Robert A.: *See*—
Fales, Douglas I.; and Roth, Robert A., 4,672,937, Cl. 123-509.000.

Rothenberg, Barry E.; and Billups, James O., Jr. Multi-cell tray. 4,673,651, Cl. 435-301.000.

Rowley, Frederick, to Shell Internationale Research Maatschappij B.V. Insulation material and its preparation. 4,673,697, Cl. 523-218.000.
Rubinstein, Stanley; and Baker, Stephen B., to Dataproducts Corporation. Magnetic paper clamp. 4,673,306, Cl. 400-618.000.
Rubio, Rafael: *See*—
Berne, Robert M.; Belardinelli, Luiz; and Rubio, Rafael, 4,673,563, Cl. 424-9.000.
Ruef, Lloyd M.: *See*—
Li, Allen S.; Eccles, Richard M.; and Ruef, Lloyd M., 4,673,552, Cl. 422-140.000.
Ruff, Stanley L. Carrying bag for cones with frozen comestibles. 4,674,128, Cl. 383-10.000.
Ruhrchemie Aktiengesellschaft: *See*—
Bahrmann, Helmut; Cornils, Boy; Lipps, Wolfgang; Lappe, Peter; and Springer, Helmut, 4,673,535, Cl. 260-501.150.
Rumphorst, Reiner F.: *See*—
Dessens, Petrus A.; and Rumphorst, Reiner F., 4,673,864, Cl. 323-221.000.
Ruppmann, Claus: *See*—
Peter, Cornelius; and Ruppmann, Claus, 4,672,934, Cl. 123-339.000.
Rupublic Steel Corporation: *See*—
Harris, Richard M.; Valek, David A.; Toth, James M.; and Abramczyk, Richard F., 4,673,879, Cl. 324-240.000.
Rusch, Randy A., to General Motors Corporation. Uses for buried contacts in integrated circuits. 4,673,965, Cl. 357-43.000.
Russell, Don L.: *See*—
Mayer, William J., 4,673,212, Cl. 297-195.000.
Russell, Donna J.: *See*—
Mayer, William J., 4,673,212, Cl. 297-195.000.
Russick, Edward M.: *See*—
Aubert, James H.; Clough, Roger L.; Curro, John G.; Quintana, Carlos A.; Russick, Edward M.; and Shaw, Montgomery T., 4,673,695, Cl. 521-64.000.
Russo, Peter. Self tapping stud. 4,673,323, Cl. 411-387.000.
Ryder, Francis E.; and Lisak, Stephen P., to Ryder Internation Corporation; and Textron Inc., a part interest. Headlamp adjusting mechanism. 4,674,018, Cl. 362-424.000.
Ryder Internation Corporation: *See*—
Ryder, Francis E.; and Lisak, Stephen P., 4,674,018, Cl. 362-424.000.
Ryntz, Rose A.; and Kurple, Kenneth R., to Du Pont de Nemours, E. I., and Company. Polysiloxane graft copolymers, flexible coating compositions comprising same and branched polysiloxane macromers for preparing same. 4,673,718, Cl. 525-476.000.
S.A.M.M.-Societe d'Applications des Machines Motrices: *See*—
Geiger, Jean-Francois, 4,673,852, Cl. 318-341.000.
Saab-Scania Aktiebolag: *See*—
Gadefelt, Bengt G.; and Bergsten, Lars E., 4,672,926, Cl. 123-90.340.
Saad, Abdelmegid K., to Com Dev Ltd. Evanescent mode triple ridge lowpass harmonic filter. 4,673,903, Cl. 333-210.000.
Saalasti, Timo T. Woodroom effluent treatment system. 4,673,013, Cl. 144-341.000.
Sachs/Freeman Associates, Inc.: *See*—
Miles, Ronald O., 4,673,244, Cl. 350-96.200.
Sachs, Klaus, to Anton Piller GmbH & Co. KG. Static inverter with an overcurrent circuit upon a short circuit. 4,674,021, Cl. 363-56.000.
Sadaki, Hiroshi; Narita, Hirokazu; Imaizumi, Hiroyuki; Konishi, Yoshinori; Inaba, Takihiro; Hirakawa, Tatsuo; Taki, Hideo; Tai, Masaru; Watanabe, Yasuo; and Saikawa, Isamu, to Handi-Pac Inc. Novel intermediates of cephalosporins and process for producing 7-(substituted or unsubstituted amino)-3-substituted methyl-Δ^3-cephem-4-carboxylic acids. 4,673,738, Cl. 540-222.000.
Saegusa, Yasuyoshi, to Sumitomo Electric Industries, Ltd. Rotary pump device having an inner rotor with an epitrochoidal envelope tooth profile. 4,673,342, Cl. 418-150.000.
Safreed, Carl K., Jr.: *See*—
Warmuth, Ivan J.; and Safreed, Carl K., Jr., 4,673,168, Cl. 267-64.270.
Sahara, Masayoshi: *See*—
Nakai, Masaaki; Sahara, Masayoshi; and Taniguchi, Nobuyuki, 4,673,275, Cl. 354-412.000.
Saikawa, Isamu: *See*—
Sadaki, Hiroshi; Narita, Hirokazu; Imaizumi, Hiroyuki; Konishi, Yoshinori; Inaba, Takihiro; Hirakawa, Tatsuo; Taki, Hideo; Tai, Masaru; Watanabe, Yasuo; and Saikawa, Isamu, 4,673,738, Cl. 540-222.000.
Saito, Keichiro: *See*—
Itaba, Yasushi; Yoshino, Tadao; Yoshifuji, Yutaka; Saito, Keichiro; and Tabuchi, Jyoichi, 4,673,619, Cl. 428-338.000.
Saito, Koichi; Mino, Yasutake; and Murakami, Ryoichi. Process for phosphating metal surfaces. 4,673,444, Cl. 148-6.15Z.
Saito, Mitsuru: *See*—
Ohzono, Kohei; Saito, Mitsuru; Hayashi, Kiyotaka; and Fujita, Taiji, 4,673,379, Cl. 474-28.000.
Saito, Morinobu: *See*—
Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, 4,673,692, Cl. 514-583.000.
Saito, Muneo; and Hayakawa, Shoichi, to Nippondenso Co., Ltd.; and Toyota Jidosha Kabushiki Kaisha. Apparatus for finding the location of a car within a vast area. 4,673,921, Cl. 340-539.000.
Saito, Suzuo, to Kabushiki Kaisha Toshiba. Power converter for AC load. 4,673,858, Cl. 318-805.000.
Saito, Teiichiro: *See*—
Shin, Shigeo; Takatsu, Tamao; Saito, Teiichiro; Kikuchi, Akiyoshi; and Nakanishi, Tsuneo, 4,673,123, Cl. 228-263.130.
Saka, Mitsugu, to Olympus Optical Co., Ltd. Index pulse generator capable of producing an index pulse of stabilized nature for use in optical information recording and reproduction systems. 4,674,072, Cl. 369-52.000.
Sakagami, Atsushi: *See*—
Suzuki, Tadashi; Futami, Toru; and Sakagami, Atsushi, 4,674,084, Cl. 370-85.000.
Sakaguchi, Suguru: *See*—
Satoh, Ryohei; Oshima, Muneo; Tanaka, Minoru; Sakaguchi, Suguru; Murata, Akira; and Hirota, Kazuo, 4,673,772, Cl. 174-52.0FP.
Sakai, Hiroaki, to Matsushita Electric Industrial Co., Ltd. Multi-pen recording device. 4,673,954, Cl. 346-139.00R.
Sakai, Kango; and Shimokawa, Yasuo, to Nippon Steel Corporation. Method for supporting a metal strip under static gas pressure. 4,673,447, Cl. 148-156.000.
Sakai, Toshiaki, to Nippon Gakki Seizo Kabushiki Kaisha. Bearing bush for center pins on a piano action. 4,673,515, Cl. 252-12.000.
Sakakibara, Nobuyoshi; Hattori, Tadashi; Miura, Kazuhiko; Noguchi, Hiroki; Fukami, Akira; and Nabeta, Teiichi, to Nippondenso Co., Ltd.; and Nippon Soken, Inc. Air cleaning apparatus. 4,673,416, Cl. 55-137.000.
Sakakibara, Shiro: *See*—
Moroto, Shuzo; Taniguchi, Takao; and Sakakibara, Shiro, 4,673,071, Cl. 192-3.210.
Sakamoto, Hiroshi: *See*—
Kikuchi, Masafumi; and Sakamoto, Hiroshi, 4,673,984, Cl. 358-190.000.
Sakamoto, Takahide; and Hiroshima, Tatsuo, to Sumitomo Metal Industries, Ltd. Zirconium liner thickness measuring method and an apparatus therefor for a zirconium alloy tube. 4,673,877, Cl. 324-225.000.
Sakata, Hirotsugu: *See*—
Hayano, Makoto; Nagatomo, Shigemi; Sakata, Hirotsugu; Hatori, Mitsuo; and Hattori, Hitoshi, 4,673,339, Cl. 418-15.000.
Salomon S.A.: *See*—
Benoit, Louis; and Nerrinck, Bernard, 4,672,755, Cl. 36-117.000.
Salvo, E. Vincent, to United States Gypsum Company. Modified runner and area separation wall structure utilizing runner. 4,672,785, Cl. 52-241.000.
Salzman, Joseph; Lang, Robert J.; and Yariv, Amnon, to California Institute of Technology. Lateral coupled cavity semiconductor laser. 4,674,096, Cl. 372-50.000.
Salzmann, Theodor: *See*—
Peppel, Michael; and Salzmann, Theodor, 4,674,023, Cl. 363-57.000.
Sambursky, Michael H., to K & S Systems, Inc. Locking switch for automobile electrical systems and the like. 4,673,776, Cl. 200-43.080.
Sames, William C.: *See*—
Fenton, Ronald L.; and Sames, William C., 4,673,098, Cl. 220-88.00A.
Sammells, Anthony F.: *See*—
Ang, Peter G. P.; and Sammells, Anthony F., 4,673,473, Cl. 204-59.00R.
San Diego Gas & Electric: *See*—
Kozak, Michael A., III, 4,672,998, Cl. 137-614.040.
Sanchez, Lawrence, to Nuclear Medical Products, Inc. Multi-dose radio-isotope container. 4,673,813, Cl. 250-506.100.
Sandefur, Charles W.; and Thomas, Thomas J., to Mobay Corporation. Anionic dye dispersions with enhanced cold water solubility upon dilution. 4,673,410, Cl. 8-528.000.
Sanden Corporation: *See*—
Kurosawa, Akihito; and Anazawa, Osamu, 4,673,105, Cl. 221-281.000.
Mabe, Atsushi; and Negishi, Masami, 4,673,340, Cl. 418-15.000.
Sanders Associates, Inc.: *See*—
Liu, Dean-Yuan; and Sholtis, Albert A., 4,673,304, Cl. 400-208.000.
Sanders, Glen A., to Honeywell Inc. Passive cavity gyro bias eliminator. 4,673,293, Cl. 356-350.000.
Sandiford, Burton B.; and Zillmer, Roger C., to Cities Service Oil and Gas Corporation. Gel and process for preventing carbon dioxide break through. 4,673,038, Cl. 166-270.000.
Sandoz Ltd.: *See*—
Moser, Helmut; Greve, Manfred; Pedrazzi, Reinhard; and Wald, Roland, 4,673,735, Cl. 534-606.000.
Sandoz Pharmaceuticals Corp.: *See*—
Gadient, Fulvio, 4,673,674, Cl. 514-220.000.
Houlihan, William J.; and Lee, Mark L., 4,673,672, Cl. 514-95.000.
Sands, Donald F. Bed rail cushion system. 4,672,698, Cl. 5-424.000.
Sanjo Machine Works Ltd.: *See*—
Ono, Shuichi; Aida, Satoru; and Hoshino, Kinshiro, 4,672,796, Cl. 53-449.000.
Sankyo Company, Limited: *See*—
Terada, Atsusuke; and Wachi, Kazuyuki, 4,673,761, Cl. 562-459.000.
Sannel, Benjamin H., to Pako Corporation. Apparatus and method for transporting photosensitive sheets in a photoprocessor. 4,673,251, Cl. 354-322.000.
Sanshin Kogyo Kabushiki Kaisha: *See*—
Iwai, Tomio; and Nakahama, Ryoji, 4,673,358, Cl. 440-61.000.
Kojima, Akinori, 4,673,360, Cl. 440-88.000.

Sansone, Ronald P.; Cruz-Uribe, Antonio S.; and Chang, Mike S. H., to Pitney Bowes Inc. Offset ink jet postage printing. 4,673,303, Cl. 400-126.000.

Sansores, Roy. Seating surface/gameboard device. 4,673,184, Cl. 273-286.000.

Santalla, Richard W.; Kokkinos, Angelos; Collette, Robert J.; and McCartney, Michael S., to Combustion Engineering, Inc. System for injecting overfire air into a tangentially-fired furnace. 4,672,900, Cl. 110-264.000.

Santangelo, Francesco: *See*—
Casagrande, Cesare; and Santangelo, Francesco, 4,673,671, Cl. 514-80.000.

Saraswat, Krishna C.: *See*—
Gardner, Donald S.; Saraswat, Krishna C.; and Barbee, Troy W., Jr., 4,673,623, Cl. 428-620.000.

Sarcem S.A.: *See*—
Bonello, Philippe, 4,674,106, Cl. 377-82.000.

Sari, Eric T., to ETS Energy Technology Systems Inc. System for the treatment of edge supported substrates. 4,672,914, Cl. 118-641.000.

Sarkki, Juha: *See*—
Engstrom, Folke; and Sarkki, Juha, 4,672,918, Cl. 122-4.00D.

Sartori, Mario: *See*—
Giorgetta, Valerio; Poletta, Vanni; Sartori, Mario; and Siligoni, Marco, 4,673,830, Cl. 307-297.000.

Sarugaku, Toshio; Motoe, Hisafumi; Tokuhara, Masaharu; and Hongu, Masayuki, to Sony Corporation. Picture-in-picture television receivers. 4,673,983, Cl. 358-183.000.

Sasaki, Haruyoshi: *See*—
Sasaki, Makoto; Sasaki, Haruyoshi; and Sato, Hisato, 4,673,756, Cl. 558-416.000.

Sasaki, Makoto; Sasaki, Haruyoshi; and Sato, Hisato, to Dainippon Ink and Chemicals, Inc. Nematic liquid crystalline compounds. 4,673,756, Cl. 558-416.000.

Sasaki, Toshio: *See*—
Tsushima, Noburu; Fuse, Masashi; Mimori, Teruo; Sasaki, Toshio; and Mukai, Tadashi, 4,673,878, Cl. 324-226.000.

Sasaki, Yasumi: *See*—
Yamaguchi, Masayoshi; Meguro, Kazunori; Matsuo, Shuitsu; and Sasaki, Yasumi, 4,673,435, Cl. 75-235.000.

Sasakura, Tadao: *See*—
Itoh, Shimpei; and Sasakura, Tadao, 4,673,598, Cl. 427-412.000.

Sato, Hiromi: *See*—
Ishizumi, Kikuo; Ohashi, Naohito; Tanno, Norihiko; Sato, Hiromi; Fukui, Masaru; and Morisada, Shinya, 4,673,668, Cl. 514-34.000.

Sato, Hisato: *See*—
Sasaki, Makoto; Sasaki, Haruyoshi; and Sato, Hisato, 4,673,756, Cl. 558-416.000.

Sato, Michitaka: *See*—
Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, 4,673,692, Cl. 514-583.000.

Sato, Mituo: *See*—
Shoji, Toru; Sugiyama, Mitsuru; Takezawa, Makoto; Akiba, Yuichi; Kaneko, Akira; and Sato, Mituo, 4,673,596, Cl. 427-262.000.

Sato, Takeshi: *See*—
Kobo, Kazuo; Morotomi, Noriaki; and Sato, Takeshi, 4,673,979, Cl. 358-142.000.

Sato, Yoshikuni, to NEC Corporation. Information processing apparatus having a sequence control function. 4,674,063, Cl. 364-900.000.

Satoh, Ryohei; Oshima, Muneo; Tanaka, Minoru; Sakaguchi, Suguru; Murata, Akira; and Hirota, Kazuo, to Hitachi, Ltd. Electronic circuit device and method of producing the same. 4,673,772, Cl. 174-52.0FP.

Savage, Nigel C. Bath with air jet. 4,672,692, Cl. 4-543.000.

Savov, Krestyo T.: *See*—
Vatzov, Vassil N.; Savov, Krestyo T.; and Stanev, Stefan G., 4,672,859, Cl. 74-479.000.

Sawada, Kazuo; Takano, Satoshi; and Ezaki, Shigeo, to Sumitomo Electric Industries, Ltd. Copper based wire electrode for wire electro-discharge machining. 4,673,790, Cl. 219-69.00W.

Sawada, Yasushi: *See*—
Akasaka, Tamotsu; Tomiuchi, Shinichi; Seto, Kazuo; Matsui, Kenichi; and Sawada, Yasushi, 4,673,543, Cl. 264-82.000.
Shiraki, Yasuhiro; Katayama, Yoshifumi; Murayama, Yoshimasa; Morioka, Makoto; Sawada, Yasushi; Mishima, Tomoyoshi; Kuroda, Takao; and Maruyama, Eiichi, 4,673,959, Cl. 357-22.000.

Scandia Packaging Machinery Co.: *See*—
Alexander, James; and Bronander, Wilhelm B., III, 4,672,795, Cl. 53-446.000.

Scanlon, John F.; Sherman, William D.; and Oman, Joel E., to Sundstrand Corporation. Flexible fluid for transferring fluids. 4,673,002, Cl. 138-149.000.

Scantlin, John R.: *See*—
Flanagin, Stephen D.; Bubb, Howard G.; and Scantlin, John R., 4,674,082, Cl. 370-60.000.

Schaal, Alfred: *See*—
Denis, Rene ; Ghiringhelli, Giulio; and Schaal, Alfred, 4,673,922, Cl. 340-572.000.

Schadlich, Fritz: *See*—
Hornung, Friedrich; Paule, Kurt; and Schadlich, Fritz, 4,673,318, Cl. 408-9.000.

Scharnweber, David H.: *See*—
Hoppie, Lyle O.; Chute, Richard; Scharnweber, David H.; and Waichunas, Kenneth P., 4,672,938, Cl. 123-538.000.

Scharpey, Wilhelm, to Swiss Aluminium Ltd. Reduction pot. 4,673,481, Cl. 204-243.00R.

Schembri, John J., to Pacific Bell. Patch unit for fiber optic distribution network. 4,673,246, Cl. 350-96.220.

Schenck Pegasus: *See*—
Meyer, Walter E., 4,672,844, Cl. 73-118.100.

Schenk, Richard C., to Xerox Corporation. Soft nip damping inverter. 4,673,176, Cl. 271-186.000.

Schenstrom, Inga-Lena. Sitting bathtub. 4,672,693, Cl. 4-555.000.

Schering AG: *See*—
Burba, Christian; Goeke, Ulrich; and Esper, Norbert, 4,673,710, Cl. 525-111.500.

Schering Aktiengesellschaft: *See*—
Laurent, Henry; and Wiechert, Rudolf, 4,673,673, Cl. 514-178.000.

Scheurer, Robert S.; and Hancock, Kendal, to Scheurer, Robert S. Water ski binder. 4,673,365, Cl. 441-70.000.

Scheuter, Felix; and Schindler, Ernst, to Haenni & Cie. AG. Weighing device for weighing wheel loads. 4,673,049, Cl. 177-209.000.

Schiefer, Erwin, to Hilti Aktiengesellschaft. Slotted anchoring bush. 4,673,322, Cl. 411-40.000.

Schiff, Otto M.; and Rikis, Vitolds. Compact multiple image camera with color filter wheel. 4,673,269, Cl. 354-76.000.

Schindler, Ernst: *See*—
Scheuter, Felix; and Schindler, Ernst, 4,673,049, Cl. 177-209.000.

Schlaich, Jorg; and Bergermann, Rudolf. Method and apparatus for anchoring cables of high-tensile steel wire. 4,673,309, Cl. 403-265.000.

Schlegel, Hans-Joachim, to Inprohold Establishment. One-piece implantation lens. 4,673,406, Cl. 623-6.000.

Schleiermacher, Herbert: *See*—
Wahnschaffe, Jurgen; Hartmann, Ernst-Siegfried; Casper, Karl-Josef; zur Nieden, Achim; and Schleiermacher, Herbert, 4,672,923, Cl. 123-41.740.

Schlenkrich, Bernd: *See*—
Bartko, Kristine; Gabler, Dieter; Heinrich, Peter; Luckner, Joachim; and Schlenkrich, Bernd, 4,672,833, Cl. 72-111.000.

Schlensog, Klaus; Beer, Christian; and Riedweg, Robert, to Ameda AG. Breast pump. 4,673,388, Cl. 604-74.000.

Schlueter, Gary R.; Kettlitz, Karsten K.; and Arnone, Louis F., III, to Arnone, Louis F., III. Gold-crowned domed garment button and manufacturing method. 4,672,718, Cl. 24-90.00A.

Schmidgall, Eugene D., to Hancock Concrete Products Co., Inc. Molding forms for making precast portal assembly sections for culverts. 4,673,159, Cl. 249-159.000.

Schmidt, Bruce C. In-flight problem situation simulator. 4,673,356, Cl. 434-35.000.

Schmidt, Donald R., to Encon Systems, Ltd. Full-flow filter for internal combustion engine, adaptable for use with a by-pass filter. 4,672,932, Cl. 123-196.00A.

Schmidt, Hans-Georg, to Dynamit Nobel AG. Process for the preparation of vinylcyclopropanecarboxylic acid derivatives. 4,673,760, Cl. 560-124.000.

Schmidt, Holger: *See*—
Schuster, Hans K.; Heins, Jens-Peter; Gockel, Bernhard; and Schmidt, Holger, 4,672,841, Cl. 73-38.000.

Schmidt, Wilhelm: *See*—
Schneider, Horst; Schmidt, Wilhelm; and Daniels, Erwin, 4,673,249, Cl. 350-287.000.

Schmieder, Lothar. Device for measuring forces and torque in different directions. 4,672,855, Cl. 73-862.040.

Schmitt, Wilhelm, to Carl Feudenberg, Firma. Method of making a shaft seal ring. 4,672,733, Cl. 29-511.000.

Schmoelzer, Ernst, to Alfred Teves GmbH. Brake pressure control unit. 4,673,224, Cl. 303-56.000.

Schneider, Alfred: *See*—
Prestele, Erich; Schneider, Alfred; Hepperle, Willi; Katzer, Johann; Stephany, Christian; and Lopic, Franz, 4,673,307, Cl. 401-289.000.

Schneider, Horst; Schmidt, Wilhelm; and Daniels, Erwin, to Carl-Zeiss-Stiftung. Drive for a prismatic compensator. 4,673,249, Cl. 350-287.000.

Schoen, Oscar W., Jr. Saturated vapor pressure release mechanism. 4,674,074, Cl. 367-172.000.

Schon, Detlef G.: *See*—
Bringmann, Udo; Drews, Klaus; and Schon, Detlef G., 4,673,588, Cl. 427-41.000.

Schornick, Gunnar: *See*—
Lehner, August; Heil, Guenter; Lenz, Werner; Balz, Werner; Kohl, Albert; and Schornick, Gunnar, 4,673,591, Cl. 427-48.000.

Schrader, Heinolf: *See*—
Schroeder, Guenter; Dudek, Guenther; and Schrader, Heinolf, 4,673,814, Cl. 250-506.100.

Schram, Cornelius J., to Internationale Octrooi Maatschappij "Octropfa" BV. Particle separation. 4,673,512, Cl. 210-748.000.

Schrieber, Ricky J., to Allied Corporation. Method and apparatus for generating a set of signals representing a curve. 4,674,059, Cl. 364-523.000.

Schroeder, Guenter; Dudek, Guenther; and Schrader, Heinolf, to Deutsche Gesellschaft fur Wiederaufarbeitung von Kernbrennstoffen mbH. Container for receiving and safely storing radioactive materials and method for tightly sealing the same. 4,673,814, Cl. 250-506.100.

Schroer, Wolf-Dieter; Muszik, Janos; Cramm, Gunther; and Benn, Otto, to Bayer Aktiengesellschaft. Paper auxiliary from condensation product of aliphatic polyol-ether-amine and compound polyfunctional toward amino groups. 4,673,729, Cl. 528-397.000.

Schrom, Ralf-Henning; and Tratter, Walter P., to General Motors Corporation. Mounting aid and method for assembling a rear bench seat of a motor vehicle. 4,672,730, Cl. 29-241.000.

Schubert, Ernst: *See*—
Krakkay, Tibor; Poggi, Tatjana; and Schubert, Ernst, 4,673,721, Cl. 526-329.300.

Schuett, Walter, to BASF Aktiengesellschaft. Storage container for a tape cassette. 4,673,083, Cl. 206-387.000.

Schuldt, Larry J. Electrical box with integral air and moisture barrier. 4,673,097, Cl. 220-3.500.

Schulten, Rudolf: *See*—
Iniotakis, Nicolaos; von der Decken, Claus-Benedict; Hecker, Rudolf; Frohling, Werner; and Schulten, Rudolf, 4,673,547, Cl. 376-314.000.

Schurch, Ernesto. Tilting exercise bed actuated by a linear electromechanical device. 4,672,697, Cl. 5-62.000.

Schuster, Hans K.; Heins, Jens-Peter; Gockel, Bernhard; and Schmidt, Holger, to Gesaner & Co. GmbH. Measuring head for measuring the porosity of a moving strip. 4,672,841, Cl. 73-38.000.

Schuster, Ludwig: *See*—
Buschmann, Ernst; Schuster, Ludwig; Goetz, Norbert; Pommer, Ernst-Heinrich; and Ammermann, Eberhard, 4,673,683, Cl. 514-317.000.

Schwaber, James S.: *See*—
Jansson, Peter A.; Rogers, Wade T.; and Schwaber, James S., 4,673,988, Cl. 358-280.000.

Schwarze, Werner; Wolff, Siegfried; Remmel, Hans; and Lambertz, Horst, to Degussa AG. Bis-(2-ethylamino-4-diethylamino-s-triazine-6-yl) tetrasulfide, process for its production, use and vulcanizable mixtures containing it. 4,673,741, Cl. 544-209.000.

Schwemmer, Martin: *See*—
Bors, Hans; Egger, Peter; Gotz, Albert; and Schwemmer, Martin, 4,672,705, Cl. 8-151.000.

Schwengers, Dieter, to Pfeifer & Langen. Process for the manufacture of iso-malto-oligosaccharide monovalent haptens. 4,673,643, Cl. 435-97.000.

Schwickert, Manfred J.; and Lemmens, Pierre L., to Engetra S.A. Flue gas injection device in a cooling tower. 4,673,421, Cl. 55-238.000.

Schwob, Pierre; and Bontoux, Daniel, to SEB S.A. Thermal cutout. 4,673,909, Cl. 337-407.000.

Scorer, Michael: *See*—
Hunter, Ian; Mason, Graham; and Scorer, Michael, 4,673,298, Cl. 374-122.000.

Scott, Gregory C., to Development Finance Corporation of New Zealand. Upholstery button. 4,672,719, Cl. 24-113.00R.

Seal Company of New England: *See*—
Champlin, George B., 4,672,879, Cl. 87-7.000.

Sealand Technology, Inc.: *See*—
Sigler, James, 4,672,690, Cl. 4-423.000.

Seaman, Sharon A.: *See*—
Small, Leonard E.; Garrison, Paul H., Jr.; Winkler, William M.; Seaman, Sharon A.; and Papa, Alyce J., 4,673,525, Cl. 252-132.000.

Sears, Jerome; Parfomak, Walter; and Kluss, Walter, to Allied Corporation. Permanent magnet motor closed loop restarting system. 4,673,849, Cl. 318-272.000.

SEB S.A.: *See*—
Schwob, Pierre; and Bontoux, Daniel, 4,673,909, Cl. 337-407.000.

Sedlaczek, Walter, to Miset AG. Process and apparatus for the centrifugal separation of fine-grain mineral mixtures. 4,673,491, Cl. 209-453.000.

Seeq Technology, Inc.: *See*—
Gupta, Anil, 4,673,829, Cl. 307-296.00A.

Segawa, Makoto: *See*—
Ariizumi, Shoji; and Segawa, Makoto, 4,673,969, Cl. 357-71.000.

Seigneurin, Michel: *See*—
Luiset, Jean-Jacques; and Seigneurin, Michel, 4,673,351, Cl. 433-29.000.

Seiko Instruments & Electronics Ltd.: *See*—
Inoue, Yuichi, 4,673,857, Cl. 318-696.000.

Seio, Mamoru: *See*—
Ishikawa, Katsukiyo; Nishijima, Kanji; and Seio, Mamoru, 4,673,458, Cl. 156-659.100.

Sekiguchi, Kanetaka: *See*—
Tanabe, Hiroshi; Yamamoto, Etsuo; Togashi, Seigo; Sekiguchi, Kanetaka; Aota, Katsumi; and Sorimachi, Kazuaki, 4,673,253, Cl. 350-339.00F.

Sekita, Katsuji: *See*—
Kogure, Tsuneo; Tsuchiyama, Yuji; Amano, Tadashi; Takahashi, Hideaki; Sekita, Katsuji; and Akami, Ichio, 4,672,831, Cl. 72-21.000.

Sekiya, Tetsuo: *See*—
Souda, Yutaka; Imakoshi, Shigeyoshi; Suyama, Hideo; Uchida, Hiroyuki; Iida, Yasuhiro; and Sekiya, Tetsuo, 4,673,998, Cl. 360-113.000.

Sekozawa, Teruji: *See*—
Shioya, Makoto; Sekozawa, Teruji; Funabashi, Motohisa; Ishida, Masahiro; and Tokuda, Hiroatsu, 4,674,028, Cl. 364-148.000.

Selfix, Inc.: *See*—
Chap, John P., 4,673,089, Cl. 211-71.000.

Senior, Ian S. T. Head joints for transverse flutes. 4,672,878, Cl. 84-384.000.

Senoue, Makoto; Terase, Kunihiko; and Nakaya, Keiichi, to Asahi Glass Company, Ltd. Method for treating a waste gas. 4,673,558, Cl. 423-240.000.

Sentron v.o.f.: *See*—
Otten, Josephus M., 4,672,971, Cl. 128-635.000.

Seppanen, Hanneli: *See*—
Lofgren, Barbro U.; Luciani, Luciano; Seppanen, Hanneli; Stjernberg, Maria H.; and Iiskola, Eero I., 4,673,661, Cl. 502-111.000.

Serbiak, Paul J.: *See*—
Lassen, Frederich O.; Sherrod, Earle H.; Nichols, Ann M.; and Serbiak, Paul J., 4,673,403, Cl. 604-385.00R.

Servant, Mireille: *See*—
Hache, Jean C.; and Servant, Mireille, 4,673,265, Cl. 351-217.000.

Setescak, Linda L.: *See*—
Shutske, Gregory M.; Setescak, Linda L.; and Allen, Richard C., 4,673,746, Cl. 546-272.000.

Seto, Belinda; and Gerety, Robert J., to United States of America, Health and Human Services. Purified antigen from non-A, non-B hepatitis causing factor. 4,673,634, Cl. 435-5.000.

Seto, Kazuo: *See*—
Akasaka, Tamotsu; Tomiuchi, Shinichi; Seto, Kazuo; Matsui, Kenichi; and Sawada, Yasushi, 4,673,543, Cl. 264-82.000.

Setoyama, Eiji; Arimatsu, Keiji; and Ohshita, Youichi, to Hitachi, Ltd. Sputtering apparatus. 4,673,482, Cl. 204-298.000.

Setoyama, Youichi, to NEC Corporation. Driving device for a thermal element. 4,673,952, Cl. 346-76.0PH.

Sevenson Company: *See*—
Steiner, Glenn M., 4,672,916, Cl. 119-52.00B.

SGS Microelettronica S.p.A.: *See*—
Cini, Carlo; Diazzi, Claudio; and Erratico, Pietro, 4,673,889, Cl. 330-10.000.

Shaffer, David T.: *See*—
Gingerich, David J.; Granitz, Richard F.; Rose, William H.; and Shaffer, David T., 4,673,837, Cl. 310-239.000.

Shah, Ashwin H.: *See*—
Chatterjee, Pallab K.; and Shah, Ashwin H., 4,673,962, Cl. 357-23.600.

Shannon, Robert R.: *See*—
Johnson, Steve A.; and Shannon, Robert R., 4,673,290, Cl. 356-73.100.

Sharps, Gordon V., Jr.; and Su, Tien-Kuei, to Mobil Oil Corporation. Polymer blend and method for obtaining same. 4,673,711, Cl. 525-240.000.

Shaw, Montgomery T.: *See*—
Aubert, James H.; Clough, Roger L.; Curro, John G.; Quintana, Carlos A.; Russick, Edward M.; and Shaw, Montgomery T., 4,673,695, Cl. 521-64.000.

Shaw, Robert R.; and Gregory, Steven D. Apparatus for raising and supporting a building. 4,673,315, Cl. 405-230.000.

Shefter, Eli: *See*—
Di Luccio, Robert C.; Duggins, Ray B.; and Shefter, Eli, 4,673,565, Cl. 424-443.000.

Shell Internationale Research Maatschappij B.V.: *See*—
Rowley, Frederick, 4,673,697, Cl. 523-218.000.

Shell Oil Company: *See*—
Nieskens, Martin J. P. C.; and Ramamurthy, Ramalinga, 4,673,557, Cl. 423-230.000.
van den Steen, Leon, 4,674,010, Cl. 361-433.000.

Shennib, Adnan: *See*—
Kondraske, George V.; and Shennib, Adnan, 4,674,112, Cl. 379-96.000.

Shepard, Howard M.; Barkan, Edward D.; and Swartz, Jerome, to Symbol Technologies, Inc. Narrow-bodied, single- and twin-windowed portable scanning head for reading bar code symbols. 4,673,805, Cl. 235-472.000.

Shepard, John D.: *See*—
Reynolds, David P.; Shepard, John D.; and Stone, Samuel L., Jr., 4,673,207, Cl. 296-39.00R.

Sheriff, Jack W., to Modublox & Co., Inc. Wideband VHF/UHF radio antenna with quarter-wave transformer. 4,673,949, Cl. 343-825.000.

Sherman, Daniel A. Rodent glue trap with ramps for retaining a removable adhesive tray. 4,672,770, Cl. 43-58.000.

Sherman, Paul: *See*—
Elmore, Carl L.; Sherman, Paul; and McGrath, Daniel A., 4,673,459, Cl. 159-13.100.

Sherman, William D.: *See*—
Scanlon, John F.; Sherman, William D.; and Oman, Joel E., 4,673,002, Cl. 138-149.000.

Shernov, Stephen L.; Siegal, Maurice; and Markowitz, Richard, to Faberge Incorporated. Mousse hair composition. 4,673,569, Cl. 424-47.000.

Shero, David J.; Dadpey, Habib; and Magee, C. Scott, to Westinghouse Electric Corp. Induction motor synthesis control apparatus and method. 4,673,859, Cl. 318-810.000.

Sherrod, Earle H.: *See*—
Lassen, Frederich O.; Sherrod, Earle H.; Nichols, Ann M.; and Serbiak, Paul J., 4,673,403, Cl. 604-385.00R.

Sherwood Medical Company: *See*—
Flynn, Daniel P.; and Ranford, Alan B., 4,673,161, Cl. 251-10.000.

Shibata, Toshihiro: *See*—
Minagawa, Motonobu; Nakahara, Yutaka; Shibata, Toshihiro; and Arata, Ryozo, 4,673,701, Cl. 524-99.000.

Shibuya Kogyo Co., Ltd.: *See*—
Yamamoto, Hisashi; and Konaka, Yukio, 4,673,381, Cl. 493-128.000.

Shiels, J. Michael. Lift/tilt-bed trailer. 4,673,328, Cl. 414-471.000.

Shigematsu, Takashi: *See*—
Tokoro, Setsuo; Shigematsu, Takashi; and Watanabe, Tomoyuki, 4,673,378, Cl. 474-18.000.

Shigemura, Yutaka: *See*—
Hisajima, Masahiko; Shigemura, Yutaka; Makiura, Yoshinori; and Ishito, Mitsuya, 4,673,283, Cl. 355-14.0SH.

Shimamoto, Kozo: *See*—
Uchikawa, Fusaoki; Takeuchi, Morihisa; Shimamoto, Kozo; Miyao, Kunihiko; Momiyama, Kimio; and Watarai, Hisao, 4,673,910, Cl. 338-35.000.
Shimizu, Hirokazu: *See*—
Matsuno, Yutaka; Hatanaka, Yasunori; Shimizu, Hirokazu; Ishigaki, Masahiro; Harada, Hiroshi; Kawada, Michihiro; and Wakita, Yasukuni, 4,673,188, Cl. 277-212.0FB.
Shimizu, Isamu: *See*—
Inoue, Eiichi; Shimizu, Isamu; and Komatsu, Toshiyuki, 4,673,628, Cl. 430-58.000.
Shimokawa, Yasuo: *See*—
Sakai, Kango; and Shimokawa, Yasuo, 4,673,447, Cl. 148-156.000.
Shimomura, Manabu, to Kabushikikaisha Hara Shokki Seisakusho. Apparatus for swinging nipper frame of comber. 4,672,717, Cl. 19-225.000.
Shimoyama, Hiroyoshi, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor integrated circuit. 4,673,966, Cl. 357-68.000.
Shimura, Takanori: *See*—
Funabashi, Tsuneo; Iwasaki, Kazuhiko; Yamaguchi, Noboru; Shimura, Takanori; and Tatezaki, Junichi, 4,674,037, Cl. 364-200.000.
Shin-Etsu Chemical Co., Ltd.: *See*—
Fujiki, Hironao; Yamaguchi, Koichi; and Yamamoto, Yasushi, 4,673,621, Cl. 428-420.000.
Shin, Shigeo; Takatsu, Tamao; Saito, Teiichiro; Kikuchi, Akiyoshi; and Nakanishi, Tsuneo, to Nippon Welding Rod Co., Ltd.; Fuji Electric Company Ltd.; and Fuji Electric Corporate Research. Filler for welding a heat resistant nickel-base alloy. 4,673,123, Cl. 228-263.130.
Shinbrot, Troy, to Xerox Corporation. Frictionless vacuum feeder for book copying. 4,673,286, Cl. 355-25.000.
Shingu Shoko, Ltd.: *See*—
Ota, Keizo, 4,672,798, Cl. 56-12.700.
Shinjo, Masayoshi: *See*—
Fukui, Shosin; Shinjo, Masayoshi; Aoyama, Hirokazu; Okazaki, Yasuko; Enjo, Naonori; and Hayashi, Kazunori, 4,673,712, Cl. 526-253.000.
Shinmi, Akira: *See*—
Takagi, Hiroshi; Shinmi, Akira; and Suzuki, Kenji, 4,673,612, Cl. 428-216.000.
Shinohara, Akira: *See*—
Morinaga, Michio; Ikeda, Akira; and Shinohara, Akira, 4,673,749, Cl. 548-490.000.
Shinohara, Koichi: *See*—
Yoshida, Hideki; Shinohara, Koichi; and Suzuki, Takashi, 4,673,617, Cl. 428-323.000.
Shinohara, Yoshitsugu: *See*—
Ohmae, Kenichi; Tateisi, Kazuma; Shinohara, Yoshitsugu; and Ueno, Nobuyuki, 4,673,802, Cl. 235-379.000.
Shinozake, Takashi; and Ishikawa, Satoshi, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle housing exhaust system. 4,673,052, Cl. 180-219.000.
Shintani, Akinori: *See*—
Yamanishi, Kazuhiko; Shintani, Akinori; Okajima, Satoru; and Hanada, Toshiro, 4,673,635, Cl. 435-10.000.
Shiokawa, Youichi: *See*—
Ueda, Ikuo; Shiokawa, Youichi; and Manabe, Takashi, 4,673,676, Cl. 514-267.000.
Shionogi & Co., Ltd.: *See*—
Jizomoto, Hiroaki, 4,673,567, Cl. 424-38.000.
Kiso, Yoshiaki; and Nakao, Kazuwa, 4,673,732, Cl. 530-326.000.
Shioya, Makoto; Sekozawa, Teruji; Funabashi, Motohisa; Ishida, Masahiro; and Tokuda, Hiroatsu, to Hitachi, Ltd. Identification method of a process parameter. 4,674,028, Cl. 364-148.000.
Shirahama, Ichiro: *See*—
Mochida, Yoshihiro; Adachi, Nobuo; and Shirahama, Ichiro, 4,673,294, Cl. 356-381.000.
Shirahata, Ryuji; Arai, Yoshihiro; and Yasunaga, Tadashi, to Fuji Photo Film Company, Limited. Magnetic recording medium having iron nitride recording layer. 4,673,610, Cl. 428-213.000.
Shirai, Kazunari; Kamioka, Hajime; and Koike, Shigeyoshi, to Fujitsu Limited. Beam annealed silicide film on semiconductor substrate. 4,672,740, Cl. 29-590.000.
Shirai, Takeshi: *See*—
Yoshimoto, Shin-ichi; Ando, Reigo; Shirai, Takeshi; and Nomura, Hiroshi, 4,674,077, Cl. 369-37.000.
Shirai, Tetsuaki, to Kawasaki Jukogyo Kabushiki Kaisha. Air-cooled overhead-valve engine. 4,672,922, Cl. 123-41.660.
Shirai, Toshikazu: *See*—
Ueyama, Masato; Kanamaru, Takeshi; Shirai, Toshikazu; and Nakano, Kiyoshi, 4,673,075, Cl. 198-339.100.
Shiraishi, Hisashi: *See*—
Okamura, Hisashi; Kawamoto, Hiroshi; and Shiraishi, Hisashi, 4,673,632, Cl. 430-510.000.
Shiraki, Yasuhiro; Katayama, Yoshifumi; Murayama, Yoshimasa; Morioka, Makoto; Sawada, Yasushi; Mishima, Tomoyoshi; Kuroda, Takao; and Maruyama, Eiichi, to Hitachi, Ltd. Heterojunction FET with doubly-doped channel. 4,673,959, Cl. 357-22.000.
Shirotani, Yusuke: *See*—
Matsuo, Kazuhiko; Hasegawa, Teruyuki; Kuwano, Seigo; Yamaguchi, Ryuji; Shiwata, Akio; Hamada, Yoneichi; Komatsu, Yoshimi; Kondo, Tsuneo; Shirotani, Yusuke; Nakashima, Hirohisa; and Matsuda, Yasuhiro, 4,674,101, Cl. 373-95.000.
Shiwata, Akio: *See*—
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Shochi, Toshiyuki; and Nakajima, Kenei, to Kabushiki Kaisha Nippei Toyama. Workpiece clamping device. 4,673,173, Cl. 269-32.000.
Shockley, Steven C.: *See*—
Roerig, Arnold J.; and Shockley, Steven C., 4,673,461, Cl. 162-205.000.
Shoda, Isao: *See*—
Yoshizawa, Kenji; Komura, Hirotsugu; Kodama, Hitoshi; Ohnuki, Kazushi; Shoda, Isao; Magome, Kazuo; and Ito, Hiroshi, 4,673,846, Cl. 315-248.000.
Shogen, Kazuyoshi: *See*—
Yamawaki, Seiichi; Obuchi, Tomoki; Toyama, Noboru; and Shogen, Kazuyoshi, 4,673,905, Cl. 333-239.000.
Shogren, David K., to Xerox Corporation. Optical scanning of duplex documents. 4,673,285, Cl. 355-23.000.
Shoji, Toru; Sugiyama, Mitsuru; Takezawa, Makoto; Akiba, Yuichi; Kaneko, Akira; and Sato, Mituo, to Lonseal Corporation. Process for producing decorative sheet. 4,673,596, Cl. 427-262.000.
Sholtis, Albert A.: *See*—
Liu, Dean-Yuan; and Sholtis, Albert A., 4,673,304, Cl. 400-208.000.
Shorkey, David. Audio oscillator output device with pressure sensitive advance mechanism. 4,673,893, Cl. 331-64.000.
Shott, Richard L.: *See*—
Lavens, Thomas R.; Corrigan, Francis R.; Shott, Richard L.; and Bovenkerk, Harold P., 4,673,414, Cl. 51-293.000.
Shtipelman, Boris A.: *See*—
Shtipelman, Manya; and Shtipelman, Boris A., 4,673,197, Cl. 283-34.000.
Shtipelman, Manya; and Shtipelman, Boris A. Map display apparatus and method. 4,673,197, Cl. 283-34.000.
Shulman, Cindy B.; and Spenadel, Lawrence, to Exxon Research & Engineering Co. Elastomeric thermoplastic low voltage insulation on conductive substrate. 4,673,620, Cl. 428-379.000.
Shutske, Gregory M.; Setescak, Linda L.; and Allen, Richard C., to Hoechst-Roussel Pharmaceuticals, Inc. 1,2-benzisoxazoloxyacetic acids and related compounds. 4,673,746, Cl. 546-272.000.
Shyu, William M.: *See*—
Dischert, Robert A.; Topper, Robert J.; and Shyu, William M., 4,673,978, Cl. 358-140.000.
Siano, Donald B.; and Bock, Jan, to Exxon Research and Engineering Company. High molecular weight terpolymers of acrylamide, acrylic acid salts and alkylacrylamide. 4,673,716, Cl. 525-367.000.
Sias, Ralph M.; Hurley, Nancy J.; and Dalebout, Melvin W., to Baxter Travenol Laboratories, Inc. Body support pad. 4,673,605, Cl. 428-120.000.
Siczek, Roman W.; Stanley, William W.; and Mikyska, Glenn E., to Cymatics, Inc. Orbital shaker. 4,673,297, Cl. 366-208.000.
Sidey, Michael J.: *See*—
Aranguren, William L.; Restrepo, Mario A.; and Sidey, Michael J., 4,674,085, Cl. 370-85.000.
Siedle, Allen R., to Minnesota Mining and Manufacturing Company. Rhodium oxymetallate catalysts. 4,673,753, Cl. 556-15.000.
Siegal, Maurice: *See*—
Shernov, Stephen L.; Siegal, Maurice; and Markowitz, Richard, 4,673,569, Cl. 424-47.000.
Siegert, Hermann; and Ude, Werner, to Rohm GmbH. Method for recovering aromatic polyethers. 4,673,730, Cl. 528-491.000.
Siemens Aktiengesellschaft: *See*—
Bohnen, Peter; Prietzel, Gunter; and Kugler, Reinhard, 4,673,779, Cl. 200-146.00R.
Ehrmann-Falkenau, Ekkehard; Veith, Richard; and Till, Wolfgang, 4,673,901, Cl. 333-196.000.
Geyer, Jurgen; and Kegler, Ernst, 4,673,809, Cl. 250-231.0SE.
Heinen, Jochen; Kappeler, Franz; and Westermeier, Heinz, 4,674,095, Cl. 372-50.000.
Hieber, Konrad; and Neppl, Franz, 4,673,968, Cl. 357-71.000.
Oestreich, Ulrich, 4,673,247, Cl. 350-96.230.
Peppel, Michael; and Salzmann, Theodor, 4,674,023, Cl. 363-57.000.
Pink, Hans, 4,673,656, Cl. 436-173.000.
Ries, Gunther; and Heinzelmann, Karl-Georg, 4,673,881, Cl. 324-318.000.
Rohr, Franz, 4,673,544, Cl. 376-261.000.
Stengl, Reinhard; Goesele, Ulrich; and Fellinger, Christine, 4,672,738, Cl. 29-576.00B.
Westermeier, Heinz, 4,672,736, Cl. 29-569.00L.
Siemens-Albis Aktiengesellschaft: *See*—
Bachtiger, Rolf, 4,674,104, Cl. 375-37.000.
Siemens Energy and Automation, Inc.: *See*—
Hohnstein, Dean H.; Jandovitz, John S.; and Lehoczky, Kalman N., 4,673,835, Cl. 310-217.000.
SIG Schweizerische Industrie-Gesellschaft: *See*—
Steiner, Heinz, 4,673,042, Cl. 173-134.000.
Sigler, James, to Sealand Technology, Inc. Vacuum tank construction for self-contained sewage handling apparatus. 4,672,690, Cl. 4-423.000.
Signetics Corporation: *See*—
Chen, Kong-Chen; and Hage, Kees, 4,674,090, Cl. 371-25.000.
Sikora, David J.: *See*—
Coleman, James P.; Kvakovszky, George; and Sikora, David J., 4,673,508, Cl. 210-698.000.
Siliconix Incorporated: *See*—
Hill, Lorimer K., 4,674,020, Cl. 363-21.000.

Siligoni, Marco: *See—*
Giorgetta, Valerio; Poletta, Vanni; Sartori, Mario; and Siligoni, Marco, 4,673,830, Cl. 307-297.000.

Sillmann, Volker: *See—*
Musolff, Frank; and Sillmann, Volker, 4,673,236, Cl. 439-609.000.

Silverthorne, Daniel F.; Hare, Claude H. M.; and Hall, Dale. Garage door screen enclosure. 4,673,019, Cl. 160-268.00R.

Silvestri, George J., Jr., to Westinghouse Electric Corp. Moisture pre-separator for a steam turbine exhaust. 4,673,426, Cl. 55-457.000.

SIMES Societa Italiana Medicinali e Sintetici S.p.A.: *See—*
Casagrande, Cesare; and Santangelo, Francesco, 4,673,671, Cl. 514-80.000.

Simpkins, Ligaya M.: *See—*
Varma, Ravi K.; Gordon, Eric M.; and Simpkins, Ligaya M., 4,673,685, Cl. 514-333.000.

Simpson, Virgil E. Spray boom mounting and carrying system. 4,673,130, Cl. 239-167.000.

Sippican Ocean Systems, Inc.: *See—*
Hudson, Alan T.; Gagnon, David P.; Johns, David W., II; and Langenhein, William J., Jr., 4,673,363, Cl. 441-1.000.

Sirota, Vladimir. Stethoscope with image of periodically expanding and contracting heart. 4,672,975, Cl. 128-715.000.

Siska, Andrew F., Jr., to Cara Corporation. Peripheral power sequencer based on peripheral susceptibility to AC transients. 4,674,031, Cl. 364-184.000.

Sjobom, Axel H.: *See—*
Kjellqvist, Olof G.; Akerblom, Bengt O.; and Sjobom, Axel H., 4,673,875, Cl. 324-207.000.

Sjogren, Arne B., to Dymo Science Inc. Mixing pump for transport and effective mixing (homogenization) of two or more liquids (gases) with a constant, but adjustable, ratio of the liquids. 4,673,296, Cl. 366-159.000.

Sjogren, Eric B.: *See—*
Evans, David A.; and Sjogren, Eric B., 4,673,737, Cl. 540-205.000.

Skelley, Richard A.: *See—*
Graham, Lawrence D.; Skelley, Richard A.; Fetsko, Daniel G.; and Ardo, Ronald, 4,673,021, Cl. 164-122.000.

SKF Kugellagerfabriken GmbH: *See—*
Brandenstein, Manfred; Haas, Roland; and Hans, Rudiger, 4,673,301, Cl. 384-428.000.

SKF Nova AB: *See—*
Adolfsson, Rune, 4,673,375, Cl. 464-145.000.

Sladen, Francis: *See—*
Logan, Maurus C.; and Sladen, Francis, 4,673,242, Cl. 350-96.200.

Slaker, Frank A.: *See—*
Archibald, G. Kent; and Slaker, Frank A., 4,673,389, Cl. 604-81.000.

Slaughter, Ivan K.: *See—*
Turner, William H.; and Slaughter, Ivan K., 4,673,041, Cl. 166-340.000.

Slicer, Allan E.: *See—*
Jorgensen, George N.; McGoldrick, Gilbert A.; and Slicer, Allan E., 4,673,229, Cl. 439-207.000.

Slifkin, Malcolm, to Allegheny-Singer Research Institute. Dry form micronitrous acid streptococci extraction-agglutination test. 4,673,639, Cl. 435-36.000.

Sloane, Edwin A.: *See—*
Urschel, William J.; and Sloane, Edwin A., 4,673,917, Cl. 340-347.0CC.

Smale, Geoffrey A., to Larnaston Limited. Sails. 4,672,907, Cl. 114-103.000.

Small, Leonard E.; Garrison, Paul H., Jr.; Winkler, William M.; Seaman, Sharon A.; and Papa, Alyce J., to Procter & Gamble Company, The. Ultra mild skin cleansing composition. 4,673,525, Cl. 252-132.000.

Smith, Daniel R. Fluorescent light fixture with removable ballast. 4,674,015, Cl. 362-217.000.

Smith, David V. Tag implantation system and method. 4,672,967, Cl. 128-330.000.

Smith, Gaylord D.; Brown, Douglas S.; Bernstein, Philip; and Weller, John E., to Inco Alloys International, Inc. Platinum and palladium complexes. 4,673,754, Cl. 556-137.000.

Smith, Geoffrey: *See—*
Rock, Kenneth; and Smith, Geoffrey, 4,673,748, Cl. 548-237.000.

Smith, Grant M.; Romania, Samuel R.; and Gibbs, Ronald T., to Burroughs Corporation. Parallel-flow air system for cooling electronic equipment. 4,674,004, Cl. 361-384.000.

Smith, James A.; and Kellett, George W., to Creative Products Resource Associates, Ltd. Glass cleaning composition containing a cyclic anhydride and a poly(acrylamidomethylpropane) sulfonic acid to reduce friction. 4,673,523, Cl. 252-91.000.

Smith, John W.; and Lipp, Ellis P., to Emhart Industries, Inc. Terminal block assembly. 4,673,239, Cl. 439-746.000.

Smith and Nephew Associated Companies p.l.c: *See—*
Potter, William D.; Kiamil, Sinan B.; and White, Nicholas D., 4,672,956, Cl. 128-90.000.

Smith, Raymond, to Teledyne Industries, Inc. Lubrication seals. 4,673,332, Cl. 415-113.000.

Smith, Richard A. G.: *See—*
Ferres, Harry; Smith, Richard A. G.; and Garman, Andrew J., 4,673,573, Cl. 424-94.630.

Smith, William H., to Manville Service Corporation. Method for applying a layer of fiber on a surface and a refractory material produced thereby. 4,673,594, Cl. 427-196.000.

Snead, Thomas E.: *See—*
Ravichandran, Ramanathan; and Snead, Thomas E., 4,673,700, Cl. 524-96.000.

Snoke, Steven R.: *See—*
Casteen, Lynn A.; Gilbert, Kim T.; Patel, Raj L.; and Snoke, Steven R., 4,673,546, Cl. 376-289.000.

Societa' Cavi Pirelli S.p.A.: *See—*
Portinari, Antonio, 4,673,540, Cl. 264-1.500.

Societe Anonyme D.B.A.: *See—*
Carre, Jean-Jacques, 4,672,812, Cl. 60-547.100.

Societe Anonyme Dite "l'Equipement Routier" : *See—*
Pichon, Joseph, 4,672,781, Cl. 52-94.000.

Societe Anonyme dite: L'Oreal: *See—*
Mahieu, Claude; and Papantoniou, Christos, 4,673,571, Cl. 424-70.000.
Zabotto, Arlette; and Contamin, Jean-Claude, 4,673,526, Cl. 252-174.160.

Societe d'Etudes, de Realisations et d'Applications Techniques: *See—*
Precoul, Michel; and Peyroux, Jean S., 4,672,896, Cl. 102-309.000.

Societe d'Etudes Scientifiques et Industrielle de l'Ile de France: *See—*
Thominet, Michel; Acher, Jacques; and Monier, Jean-Claude, 4,673,686, Cl. 514-359.000.

Soda, Yutaka: *See—*
Suyama, Hideo; Imakoshi, Shigeyoshi; Soda, Yutaka; Fuse, Takeyuki; Abe, Iwao; and Wakabayashi, Noboru, 4,673,999, Cl. 360-125.000.

Sodeco-Saia AG: *See—*
Boillat, Pierre, 4,673,855, Cl. 318-696.000.

Soga, Junko: *See—*
Murashige, Yoshio; Yanagase, Akira; Kawachi, Yasunori; and Soga, Junko, 4,673,688, Cl. 514-554.000.

Sogame, Masakazu, to Minolta Camera Kabushiki Kaisha. Electrophotographic copying apparatus. 4,673,282, Cl. 355-14.00E.

Solares, Bertha. Fishing ball. 4,672,767, Cl. 43-41.200.

Soldati, Gianluigi, to Carter-Wallace, Inc. Gelled antiperspirant compositions. 4,673,570, Cl. 424-66.000.

Solid State Systems, Inc.: *See—*
Rackin, Mark H., 4,674,083, Cl. 370-67.000.

Solis, Jesse: *See—*
Lenox, Jerril C.; and Solis, Jesse, 4,672,968, Cl. 128-380.000.

Solmat Systems Ltd.: *See—*
Assaf, Gad; and Regev, Mordechai, 4,672,950, Cl. 126-452.000.

Solomonides, Byron C., to Rockwell International Corporation. Programmable ejection seat system. 4,673,147, Cl. 244-122.00A.

Solt, Katalin: *See—*
Popovic, Radivoje; Solt, Katalin; and Berchier, Jean-Luc, 4,673,964, Cl. 357-27.000.

Someya, Hiromi; Aihara, Yoshihiko; Mizogui, Toyokazu; and Suzuki, Nobuyuki, to Canon Kabushiki Kaisha. Multi-program control device for camera. 4,673,277, Cl. 354-474.000.

Sommer, Gerhard, to Gebhard Balluff Fabrik Feinmechanischer Erzeugnisse GmbH & Co. Proximity switch insensitive to interference fields. 4,673,827, Cl. 307-116.000.

Sommer, Harold Z.; Owens, Omer O.; and Miller, Jacob I., to United States of America, Army. Isoquinilinium chemical agents. 4,673,745, Cl. 546-147.000.

Sommer, Werner: *See—*
Buck, Hermann; and Sommer, Werner, 4,673,382, Cl. 493-359.000.

Sone, Chiharu: *See—*
Kawata, Hiroitsu; Aruga, Masayoshi; Ohmura, Tadayoshi; Sonobe, Takashi; Yoneya, Satoru; and Sone, Chiharu, 4,673,564, Cl. 424-494.000.

Sonnenberg, Blazej W.: *See—*
Raddi, William J.; Johnson, Robert W., Jr.; Tracy, John G.; and Sonnenberg, Blazej W., 4,673,825, Cl. 307-66.000.

Sonobe, Takashi: *See—*
Kawata, Hiroitsu; Aruga, Masayoshi; Ohmura, Tadayoshi; Sonobe, Takashi; Yoneya, Satoru; and Sone, Chiharu, 4,673,564, Cl. 424-494.000.

Sonomo Corporation: *See—*
Dew, Douglas, 4,672,969, Cl. 128-397.000.

Sony Corporation: *See—*
Emori, Masashi, 4,673,145, Cl. 242-198.000.
Higuchi, Kunio; Miyazono, Shunichi; and Toyogucyi, Tsutomu, 4,674,080, Cl. 369-77.200.
Ito, Takamasa, 4,673,357, Cl. 434-311.000.
Kikuchi, Masafumi; and Sakamoto, Hiroshi, 4,673,984, Cl. 358-190.000.
Otsuka, Toru; and Motoyama, Tadashi, 4,674,078, Cl. 369-44.000.
Sarugaku, Toshio; Motoe, Hisafumi; Tokuhara, Masaharu; and Hongu, Masayuki, 4,673,983, Cl. 358-183.000.
Souda, Yutaka; Imakoshi, Shigeyoshi; Suyama, Hideo; Uchida, Hiroyuki; Iida, Yasuhiro; and Sekiya, Tetsuo, 4,673,998, Cl. 360-113.000.
Suyama, Hideo; Imakoshi, Shigeyoshi; Soda, Yutaka; Fuse, Takeyuki; Abe, Iwao; and Wakabayashi, Noboru, 4,673,999, Cl. 360-125.000.

Sophysa: *See—*
Marion, Bernard, 4,673,384, Cl. 604-10.000.

Sorimachi, Kazuaki: *See—*
Tanabe, Hiroshi; Yamamoto, Etsuo; Togashi, Seigo; Sekiguchi, Kanetaka; Aota, Katsumi; and Sorimachi, Kazuaki, 4,673,253, Cl. 350-339.00F.

Soto, Stephen H.: *See—*
Curtin, William J.; Adams, Cedric; and Soto, Stephen H., 4,674,116, Cl. 379-211.000.

Souda, Yutaka; Imakoshi, Shigeyoshi; Suyama, Hideo; Uchida, Hiroyuki; Iida, Yasuhiro; and Sekiya, Tetsuo, to Sony Corporation. Magnetic transducer head having series connected magnetroresistance effect sensing element with head output connected between the sensing elements. 4,673,998, Cl. 360-113.000.

Source Technology Biologicals, Inc.: *See*—
Thirumalachar, Mandayam J.; Narasimhan, Mandayam J.; and Thirumalachar, Mandayam J. K., 4,673,687, Cl. 514-460.000.

South African Inventions Development Corporation: *See*—
Hourahane, Donald H., 4,672,957, Cl. 128-92.0VD.

Southern Railway Company: *See*—
Patton, Wesley H.; and Thompson, Jeffrey L., 4,673,854, Cl. 318-649.000.

Speare, Edward J.: *See*—
Dearden, Geoffrey C.; Speare, Edward J.; Ueno, Katsuo; and Jones, Donald N., 4,673,201, Cl. 285-333.000.

Speck, Cleo T., to Herschel Corporation (Delaware Corp.). Apparatus and method for removing liquid from and cleaning a container. 4,673,006, Cl. 141-1.000.

Spenadel, Lawrence: *See*—
Shulman, Cindy B.; and Spenadel, Lawrence, 4,673,620, Cl. 428-379.000.

Spencer, Donald B., to Boeing Company, The. Instrusion detection system. 4,673,935, Cl. 342-27.000.

Spencer, John E.; Borel, Richard A.; Linxwiler, Kenneth E.; and Hoff, Andrew M., to Machine Technology, Inc. Microwave apparatus for generating plasma afterglows. 4,673,456, Cl. 156-345.000.

Spiegelstein, Wolfgang, to Kennedy Company. Cartridge tape drive with friction roller to open cartridge door. 4,673,995, Cl. 360-93.000.

Spiess, Hans P.: *See*—
Diskowski, Jorg; Jeppel, Wolfgang; Moisel, Hartmut; and Spiess, Hans P., 4,674,061, Cl. 364-571.000.

Springer, Helmut: *See*—
Bahrmann, Helmut; Cornils, Boy; Lipps, Wolfgang; Lappe, Peter; and Springer, Helmut, 4,673,535, Cl. 260-501.150.

Sprinter System AB: *See*—
Wallin, Kay, 4,672,792, Cl. 53-374.000.

Sproul, Fred C., Sr. Combination valance and conditioned air admission and return ducts. 4,672,887, Cl. 98-31.600.

Square D Company: *See*—
Jorgensen, George N.; McGoldrick, Gilbert A.; and Slicer, Allan E., 4,673,229, Cl. 439-207.000.

Staar S. A.: *See*—
Agostini, Louis P. C., 4,674,079, Cl. 369-77.100.

Staats, Charles W., to Bradford-White Corporation. Direct power vented water heater. 4,672,919, Cl. 122-13.00R.

Stahlecker, Fritz; and Feuchter, Wolfgang, to Stahlecker, Hans; and Stahlecker, Fritz. Arrangement for open-end friction spinning. 4,672,803, Cl. 57-401.000.

Stahlecker, Hans: *See*—
Stahlecker, Fritz; and Feuchter, Wolfgang, 4,672,803, Cl. 57-401.000.

Standard Oil Company: *See*—
Percec, Elena S.; and Li, George S., 4,673,717, Cl. 525-390.000.
Windischmann, Henry, 4,673,475, Cl. 204-192.110.

Standard Oil Company (Indiana): *See*—
Kaplan, Richard D., 4,673,442, Cl. 134-24.000.

Standley, Robert W., to Amoco Corporation. Photoconducting amorphous carbon. 4,673,589, Cl. 427-41.000.

Stanev, Stefan G.: *See*—
Vatzov, Vassil N.; Savov, Krestyo T.; and Stanev, Stefan G., 4,672,859, Cl. 74-479.000.

Stanford, Raymond A., to VBM Corporation. Oxygen production system with two stage oxygen pressurization. 4,673,415, Cl. 55-21.000.

Stanley, William W.: *See*—
Siczek, Roman W.; Stanley, William W.; and Mikyska, Glenn E., 4,673,297, Cl. 366-208.000.

Staub, Vincent M., Jr., to General Motors Corporation. Wheel cylinder mounting arrangement. 4,673,069, Cl. 188-331.000.

Steel, Robert C.: *See*—
Kent, William H.; and Steel, Robert C., 4,672,753, Cl. 33-366.000.

Steele, Charles S.: *See*—
Paslean, James H.; and Steele, Charles S., 4,673,762, Cl. 564-497.000.

Steffen, Klaus-Dieter; and Meyer, Gunther, to Dynamit Nobel AG. Method of preparing 3,4-dihydro-alpha-pyrones. 4,673,751, Cl. 549-294.000.

Steinberg, Itzchak Z., to Yeda Research & Development Co., Ltd. Stereoscopic optical device. 4,673,260, Cl. 350-516.000.

Steiner Company, Inc.: *See*—
Cassia, Antonio M., 4,673,109, Cl. 222-153.000.

Steiner, Glenn M., to Sevenson Company. Belt feeder apparatus with a rotary diverter assembly. 4,672,916, Cl. 119-52.00B.

Steiner, Heinz, to SIG Schweizerische Industrie-Gesellschaft. Pneumatic hammer. 4,673,042, Cl. 173-134.000.

Steinke, Kurt E.: *See*—
Hulsing, Rand H., II; Peters, Rex B.; and Steinke, Kurt E., 4,672,752, Cl. 33-302.000.

Stelzenmuller, William K., to International Business Machines Corporation. Method of spatially thresholding a discrete color image. 4,673,977, Cl. 358-133.000.

Stemmer, Gottfried: *See*—
Fruth, Rupert; Stemmer, Gottfried; and Pohl, Claus, 4,673,815, Cl. 250-548.000.

Stempfle, Johann: *See*—
Babsch, Alfred; Beth, Dieter; Panzer, Werner; and Stempfle, Johann, 4,673,810, Cl. 250-231.0SE.

Stenberg, Johan E.: *See*—
Nygren, Bo H.; and Stenberg, Johan E., 4,673,584, Cl. 427-2.000.

Stengl, Reinhard; Goesele, Ulrich; and Fellinger, Christine, to Siemens Aktiengesellschaft. Method for the manufacture of a pn junction with high breakdown voltage. 4,672,738, Cl. 29-576.00B.

Stepan Company: *See*—
Raff, Donald K., 4,673,460, Cl. 162-75.000.

Stephany, Christian: *See*—
Prestele, Erich; Schneider, Alfred; Hepperle, Willi; Katzer, Johann; Stephany, Christian; and Lopic, Franz, 4,673,307, Cl. 401-289.000.

Stephen, Donald S.: *See*—
Nelson, Ralph F.; and Stephen, Donald S., 4,673,165, Cl. 254-132.000.

Steridyne Corporation: *See*—
Poncy, George W., 4,672,700, Cl. 5-441.000.

Sterling Drug, Inc.: *See*—
Obrist, Gerhard, 4,673,107, Cl. 222-94.000.

Stevenson, Lynn B.: *See*—
Stevenson, Ralph G., 4,672,712, Cl. 16-91.000.

Stevenson, Ralph G., to Stevenson, Lynn B. Wind restraining stay roller assembly for sliding doors. 4,672,712, Cl. 16-91.000.

Steward, Ronald R. Target throwing apparatus. 4,672,942, Cl. 124-1.000.

Steyr-Daimler-Puch AG: *See*—
Lanzer, Heribert, 4,672,861, Cl. 74-665.0GE.

Stine, Joseph P. Auger hole dirt retainer. 4,672,901, Cl. 111-2.000.

Stjernberg, Maria H.: *See*—
Lofgren, Barbro U.; Luciani, Luciano; Seppanen, Hanneli; Stjernberg, Maria H.; and Iiskola, Eero I., 4,673,661, Cl. 502-111.000.

Stoldt, Stephen H.; and Walsh, Reed H., to Lubrizol Corporation, The. Fuel additive comprising a metal compound and an oxime and fuel compositions containing same. 4,673,412, Cl. 44-68.000.

Stomberg, Henrik: *See*—
Goransson, Rolf; and Stomberg, Henrik, 4,673,417, Cl. 55-148.000.

Stone, Samuel L., Jr.: *See*—
Reynolds, David P.; Shepard, John D.; and Stone, Samuel L., Jr., 4,673,207, Cl. 296-39.00R.

Storace, Anthony; and Yannella, Albert V., to AMF, Inc. Thread measurement tool. 4,672,750, Cl. 33-199.00R.

Stouffer, Ronald D., to Bowles Fluidics Corporation. Oscillating air stream apparatus for automobile defroster. 4,672,886, Cl. 98-2.090.

Strampfer, John: *See*—
Kalmus, Leslie P.; Trojan, Donald R.; Mott, Bradley; and Strampfer, John, 4,674,044, Cl. 364-408.000.

Stratford Laboratories: *See*—
Hill, Percy H., 4,672,706, Cl. 15-167.00R.

Strato Medical Corporation: *See*—
Fenton, Paul V., Jr.; and Young, Thomas M., 4,673,394, Cl. 604-175.000.

Strausburg, Larry D., to Monarch Marking Systems, Inc. Hand-held tag attacher, method of attaching tags and fasteners. 4,673,120, Cl. 227-67.000.

Strickland, Brian R.; and Edlin, George R., to United States of America, Army. Automated calibration technique for non-field perturbing (electrically small) electromagnetic field sensors. 4,673,870, Cl. 324-74.000.

Stringham, Glen E.: *See*—
Keller, Jack; and Stringham, Glen E., 4,673,128, Cl. 239-1.000.

Strong, William A. Apparatus for gasifying waste oil. 4,673,413, Cl. 48-105.000.

Stucker, Harold L., to General Electric Company. Annular rotor disk for electric meter. 4,673,874, Cl. 324-137.000.

Su, Tien-Kuei: *See*—
Sharps, Gordon V., Jr.; and Su, Tien-Kuei, 4,673,711, Cl. 525-240.000.

Subramanian, Mahadevan; Monday, Richard D.; Johnson, David B.; and Kleinschrodt, Frank J., to Fluor Corporation. Process for separating crude oil components. 4,673,490, Cl. 208-354.000.

Sugano, Toshiyuki: *See*—
Watanabe, Takahiko; Sugano, Toshiyuki; Yamamoto, Yasushi; and Murayama, Kunihiko, 4,673,541, Cl. 264-25.000.

Sugasawa, Fukashi, to Nissan Motor Company, Limited. Automotive suspension control system with self-adjustment feature. 4,673,194, Cl. 280-707.000.

Sugg, David J.: *See*—
Myers, Nancy E.; Gamblin, Rodger L.; and Sugg, David J., 4,673,468, Cl. 204-24.000.

Sugimori, Shigeru; Ogawa, Tetsuya; Goto, Yasuyuki; Isoyama, Toyoshiro; Nigorikawa, Kazunori; Kitano, Kisei; Yoshida, Naoyuki; and Furukawa, Yoshito, to Chisso Corporation. Phenoxypropanol ester derivative. 4,673,529, Cl. 252-299.630.

Suginaka, Yutaka: *See*—
Kuwata, Tamotsu; Suginaka, Yutaka; and Ohtomo, Hideo, 4,673,583, Cl. 426-573.000.

Sugino, Takuya: *See*—
Nakayama, Hajime; Aoki, Osamu; Nishijima, Shigetoshi; Horiuchi, Haruo; Sugino, Takuya; and Takagi, Shuichi, 4,672,940, Cl. 123-590.000.

Sugiyama, Jun; Suzuki, Akira; Terada, Kosei; Oguri, Shigenori; and Ishii, Shigeki, to Nippon Gakki Seizo Kabushiki Kaisha. Rhythm tone source assigning apparatus for use in electronic musical instrument. 4,672,876, Cl. 84-1.030.

Sugiyama, Mitsuru: *See*—
Shoji, Toru; Sugiyama, Mitsuru; Takezawa, Makoto; Akiba, Yuichi; Kaneko, Akira; and Sato, Mituo, 4,673,596, Cl. 427-262.000.
Sugiyama, Yoshihiko; Nanba, Keizo; Hagiwara, Michiki; Aoki, Takeshi; Iwasaki, Shosuke; and Abiko, Tetsuo, to Sumitomo Light Metal Industries, Ltd.; and Sumitomo Precision Products Co., Ltd. Fin stock material for use in plate fin heat exchanger adapted for super-high pressure service. 4,673,551, Cl. 420-535.000.
Suhara, Eiji: *See*—
Wada, Atsuki; Takahashi, Mikio; and Suhara, Eiji, 4,673,493, Cl. 210-98.000.
Sullivan, Daniel S.: *See*—
Haslegrave, John A.; and Sullivan, Daniel S., 4,673,436, Cl. 106-14.130.
Sullivan, Thomas E.; and Kulak, Mark A., to Enthone, Incorporated. Process for regenerating solder stripping solutions. 4,673,521, Cl. 252-79.300.
Sumi, Kiyohide, to Fuji Jukogyo Kabushiki Kaisha. Decompression apparatus for engines. 4,672,930, Cl. 123-182.000.
Sumikin Coke Company Limited: *See*—
Ikeda, Minoru; and Higashigawa, Yasuyuki, 4,674,054, Cl. 364-477.000.
Sumitomo Bakelite Company Limited: *See*—
Nakayama, Syoichi; Inui, Keita; and Suzuki, Setsuo, 4,673,602, Cl. 428-65.000.
Sumitomo Chemical Company, Limited: *See*—
Niwa, Kenji; and Ichikawa, Ichiro, 4,673,554, Cl. 423-63.000.
Sumitomo Electric Industries, Ltd.: *See*—
Hata, Ryosuke; Yamanouchi, Shosuke; Hirose, Masayuki; Kuwabara, Hidemitsu; Mizumoto, Yasuharu; and Hagiuda, Yasuhiro, 4,673,607, Cl. 428-172.000.
Himoto, Takeshi, 4,673,593, Cl. 427-89.000.
Kohno, Teruhisa; Nokubo, Seiji; and Matsuoka, Akio, 4,673,220, Cl. 303-6.00C.
Nishiwaki, Yoshikazu; Matsuoka, Shunji; and Okamoto, Kenji, 4,673,241, Cl. 350-3.640.
Saegusa, Yasuyoshi, 4,673,342, Cl. 418-150.000.
Sawada, Kazuo; Takano, Satoshi; and Ezaki, Shigeo, 4,673,790, Cl. 219-69.00W.
Sumitomo Light Metal Industries, Ltd.: *See*—
Sugiyama, Yoshihiko; Nanba, Keizo; Hagiwara, Michiki; Aoki, Takeshi; Iwasaki, Shosuke; and Abiko, Tetsuo, 4,673,551, Cl. 420-535.000.
Sumitomo Metal Industries, Ltd.: *See*—
Sakamoto, Takahide; and Hiroshima, Tatsuo, 4,673,877, Cl. 324-225.000.
Sumitomo Pharmaceuticals Company: *See*—
Ishizumi, Kikuo; Ohashi, Naohito; Tanno, Norihiko; Sato, Hiromi; Fukui, Masaru; and Morisada, Shinya, 4,673,668, Cl. 514-34.000.
Sumitomo Precision Products Co., Ltd.: *See*—
Sugiyama, Yoshihiko; Nanba, Keizo; Hagiwara, Michiki; Aoki, Takeshi; Iwasaki, Shosuke; and Abiko, Tetsuo, 4,673,551, Cl. 420-535.000.
Sun, Anthony M.: *See*—
Goosen, Mattheus F. A.; O'Shea, Geraldine M.; and Sun, Anthony M., 4,673,566, Cl. 424-19.000.
Sun Engineering Co., Ltd.: *See*—
Morita, Shinichi, 4,673,175, Cl. 271-10.000.
Sunds Defibrator Aktiebolag: *See*—
Kjellqvist, Olof G.; Akerblom, Bengt O.; and Sjobom, Axel H., 4,673,875, Cl. 324-207.000.
Sundstrand Corporation: *See*—
Scanlon, John F.; Sherman, William D.; and Oman, Joel E., 4,673,002, Cl. 138-149.000.
Wiemer, Douglas, 4,673,031, Cl. 165-39.000.
Sundstrand Data Control, Inc.: *See*—
Fischer, Michael T., 4,674,051, Cl. 364-443.000.
Hulsing, Rand H., II; Peters, Rex B.; and Steinke, Kurt E., 4,672,752, Cl. 33-302.000.
Sungene Technologies Corporation: *See*—
Wilcox, Anne S.; and Cooley, Gloria L., 4,673,648, Cl. 435-240.000.
Supercon, Inc.: *See*—
Wong, James, 4,674,009, Cl. 361-433.000.
Support Systems International, Inc.: *See*—
Goodwin, Vernon L., 4,672,699, Cl. 5-430.000.
Susko, Edward W.: *See*—
McCartney, Charles P.; Susko, Edward W.; and Crouse, Joseph T., 4,673,625, Cl. 429-187.000.
Suyama, Hideo; Imakoshi, Shigeyoshi; Soda, Yutaka; Fuse, Takeyuki; Abe, Iwao; and Wakabayashi, Noboru, to Sony Corporation. Multi channel magnetic transducer head. 4,673,999, Cl. 360-125.000.
Suyama, Hideo: *See*—
Souda, Yutaka; Imakoshi, Shigeyoshi; Suyama, Hideo; Uchida, Hiroyuki; Iida, Yasuhiro; and Sekiya, Tetsuo, 4,673,998, Cl. 360-113.000.
Suzuki, Akira, to Canon Kabushiki Kaisha. Image forming apparatus. 4,673,281, Cl. 355-14.00R.
Suzuki, Akira: *See*—
Sugiyama, Jun; Suzuki, Akira; Terada, Kosei; Oguri, Shigenori; and Ishii, Shigeki, 4,672,876, Cl. 84-1.030.
Suzuki, Hideo, to Nippon Gakki Seizo Kabushiki Kaisha. Waveshape memory for an electronic musical instrument. 4,672,875, Cl. 84-1.010.
Suzuki, Hideo, to Kabushiki Kaisha Toshiba. Digital signal processor. 4,674,105, Cl. 375-80.000.
Suzuki, Kenji: *See*—
Takagi, Hiroshi; Shinmi, Akira; and Suzuki, Kenji, 4,673,612, Cl. 428-216.000.
Suzuki, Masayuki; Ohara, Tsunemasa; Tosaka, Yoichi; Kobayashi, Ryuichi; Harada, Yoshihito; and Kawamura, Masaharu, to Canon Kabushiki Kaisha. Film transport apparatus for camera. 4,673,272, Cl. 354-173.110.
Suzuki, Masayuki: *See*—
Fukuda, Tsuyoshi; Suzuki, Masayuki; and Kiuchi, Masayoshi, 4,673,278, Cl. 354-479.000.
Suzuki, Nobuyuki: *See*—
Someya, Hiromi; Aihara, Yoshihiko; Mizogui, Toyokazu; and Suzuki, Nobuyuki, 4,673,277, Cl. 354-474.000.
Suzuki, Setsuo: *See*—
Nakayama, Syoichi; Inui, Keita; and Suzuki, Setsuo, 4,673,602, Cl. 428-65.000.
Suzuki, Tadashi; Futami, Toru; and Sakagami, Atsushi, to Nissan Motor Company, Limited. Network system. 4,674,084, Cl. 370-85.000.
Suzuki, Takashi: *See*—
Yoshida, Hideki; Shinohara, Koichi; and Suzuki, Takashi, 4,673,617, Cl. 428-323.000.
Suzuki, Tatsuo; and Matsumoto, Atsushi, to Terumo Kabushiki Kaisha. Medical instrument. 4,673,393, Cl. 604-167.000.
Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, to Teikoku Hormone Mfg. Co., Ltd. Diphenylmethylimine derivatives, their compositions and pharmaceutical uses. 4,673,692, Cl. 514-583.000.
Suzuki, Yukio: *See*—
Igarashi, Ryuji; and Suzuki, Yukio, 4,673,783, Cl. 219-10.55F.
Suzumura, Masanaga: *See*—
Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Kumagai, Naotake; and Tatemoto, Minoru, 4,673,193, Cl. 280-707.000.
Swarbrick, Alan. Thermoelectric generator for engine exhaust. 4,673,863, Cl. 322-2.00R.
Swartz, Jerome: *See*—
Shepard, Howard M.; Barkan, Edward D.; and Swartz, Jerome, 4,673,805, Cl. 235-472.000.
Sweetsir, Joel M. Retractable cleat for marine vessel. 4,672,909, Cl. 114-218.000.
SWF Auto-Electric GmbH: *See*—
Kluge, Hermann, 4,673,333, Cl. 415-213.00T.
Swiatlowski, George J.; Trapp, Donald P.; Liescheidt, Duane B.; McDaniel, Arden G.; and Brandt, Maurice W., to Gerber Products Company. Apparatus and method for assembling product combinations. 4,673,078, Cl. 198-450.000.
Swinney, Denis P.; Twizell, Norman; and Fergusson, Charles W., to Swinney Engineering Limited. Automatic backwashing filter. 4,673,498, Cl. 210-275.000.
Swinney Engineering Limited: *See*—
Swinney, Denis P.; Twizell, Norman; and Fergusson, Charles W., 4,673,498, Cl. 210-275.000.
Swiss Aluminium Ltd.: *See*—
Scharpey, Wilhelm, 4,673,481, Cl. 204-243.00R.
Sydansk, Robert D., to Marathon Oil Company. Permeability restoration of damaged formations. 4,673,040, Cl. 166-305.100.
Symbol Technologies, Inc.: *See*—
Shepard, Howard M.; Barkan, Edward D.; and Swartz, Jerome, 4,673,805, Cl. 235-472.000.
Syrigos, Harry, to Alpha Industries, Inc. Backfire antenna feeding. 4,673,945, Cl. 343-755.000.
Szczepanek, Andre; and Hubbins, Stephen, to Texas Instruments Incorporated. Token ring access control protocol circuit. 4,674,086, Cl. 370-86.000.
Szymski, Eugene J., to Excelsior Fitness Equipment Co. Resistance freewheel mechanism. 4,673,177, Cl. 272-73.000.
Tabata, Toshiyuki, to Nissan Motor Co., Ltd. Liquid-filled type vibration damping structure. 4,673,156, Cl. 248-559.000.
Tabbert, William D. Angle clamping tool. 4,673,174, Cl. 269-41.000.
Tabereaux, Alton T.; and Gunnip, Frank L., to Reynolds Metals Company. Alumina reduction cell. 4,673,478, Cl. 204-243.00R.
Tabuchi, Jyoichi: *See*—
Itaba, Yasushi; Yoshino, Tadao; Yoshifuji, Yutaka; Saito, Keichiro; and Tabuchi, Jyoichi, 4,673,619, Cl. 428-338.000.
Tachikawa Spring Co., Ltd.: *See*—
Yokoyama, Shoh, 4,673,215, Cl. 297-452.000.
Tadachi, Akio; and Takayama, Akira, to Alps Electric Co., Ltd. Oscillator having improved coupling between stripline and dielectric resonator. 4,673,895, Cl. 331-99.000.
Tadiran Israel Electronics Industries Ltd.: *See*—
Reppen, Gyora, 4,673,831, Cl. 307-300.000.
Taga, Yutaka: *See*—
Hosono, Chihiro; Hayakawa, Yoichi; Kubo, Seitoku; Taga, Yutaka; and Nakamura, Shinya, 4,673,072, Cl. 192-3.570.
Tagami, Tomoyuki: *See*—
Tanaka, Osami; Tagami, Tomoyuki; and Tsunoda, Kazuhiko, 4,673,053, Cl. 180-227.000.
Taguchi, Osamu: *See*—
Wake, Masayoshi; Taguchi, Osamu; and Imaizumi, Mitsuyuki, 4,673,774, Cl. 174-94.00R.
Taguchi, Takasi; Ueno, Yoshiki; and Hattori, Tadashi, to Nippon Soken, Inc. Reflecting mirror for an automobile. 4,673,248, Cl. 350-166.000.

Tai, Masaru: *See*—
Sadaki, Hiroshi; Narita, Hirokazu; Imaizumi, Hiroyuki; Konishi, Yoshinori; Inaba, Takihiro; Hirakawa, Tatsuo; Taki, Hideo; Tai, Masaru; Watanabe, Yasuo; and Saikawa, Isamu, 4,673,738, Cl. 540-222.000.

Tajima, Osamu; and Ito, Shigehiro, to Victor Company of Japan, Ltd. Optical type disc with V-shaped groove and optical type reproducing apparatus therefor. 4,674,070, Cl. 369-46.000.

Takada, Mitsuru: *See*—
Itoh, Hiroshi; and Takada, Mitsuru, 4,672,863, Cl. 74-866.000.

Takagi, Hiroshi; Shinmi, Akira; and Suzuki, Kenji, to Canon Kabushiki Kaisha. Magnetic recording medium. 4,673,612, Cl. 428-216.000.

Takagi, Isamu: *See*—
Anahara, Meiji; Muramatsu, Shigeru; Takagi, Isamu; and Tuboi, Masayoshi, 4,672,804, Cl. 57-401.000.

Takagi, Shuichi: *See*—
Nakayama, Hajime; Aoki, Osamu; Nishijima, Shigetoshi; Horiuchi, Haruo; Sugino, Takuya; and Takagi, Shuichi, 4,672,940, Cl. 123-590.000.

Takagi, Yoshito; Wakahara, Yasuyuki; Hamano, Satoru; Mori, Masanori; Hamaguchi, Masayuki; and Yoshikawa, Naoki, to Nippondenso Co., Ltd. Brush holding device for rotating electrical machines. 4,673,838, Cl. 310-239.000.

Takahashi, Akio: *See*—
Matsumura, Kiichiro; Takahashi, Akio; and Tsukamoto, Jun, 4,673,720, Cl. 526-285.000.

Takahashi, Akira; and Hasegawa, Isao, to Clarion Co., Ltd.; and Zero Engineering Ltd. Cam driven mode selection mechanism for tape recorder. 4,674,001, Cl. 360-137.000.

Takahashi, Hideaki: *See*—
Kogure, Tsuneo; Tsuchiyama, Yuji; Amano, Tadashi; Takahashi, Hideaki; Sekita, Katsuji; and Akami, Ichio, 4,672,831, Cl. 72-21.000.

Takahashi, Mikio: *See*—
Wada, Atsuki; Takahashi, Mikio; and Suhara, Eiji, 4,673,493, Cl. 210-98.000.

Takahashi, Mutsumi: *See*—
Kato, Kuniaki; and Takahashi, Mutsumi, 4,673,254, Cl. 350-345.000.

Takahashi, Norio: *See*—
Kobayashi, Yuji; and Takahashi, Norio, 4,673,807, Cl. 250-214.0AG.

Takahashi, Susumu, to Tokyo Kogaku Kikai Kabushiki Kaisha. Ophthalmic instrument having focus detecting mark projecting means. 4,673,264, Cl. 351-211.000.

Takahashi, Tadahiro, to Diesel Kiki Co., Ltd. Cooling system with device for preventing a bad odor from circulating. 4,672,816, Cl. 62-180.000.

Takahashi, Yoshio; and Hatanaka, Shigeto, to Mitsubishi Oil Co., Ltd. Sizing agent for paper making. 4,673,439, Cl. 106-287.240.

Takai, Makoto: *See*—
Wakabayashi, Toshio; Takai, Makoto; Ichikawa, Shuji; Arai, Junichiro; and Murota, Seiitsu, 4,673,684, Cl. 514-327.000.

Takaishi, Kazuaki, to Tokyo Electric Co., Ltd. Stepping motor drive circuit. 4,673,856, Cl. 318-696.000.

Takano, Satoshi: *See*—
Sawada, Kazuo; Takano, Satoshi; and Ezaki, Shigeo, 4,673,790, Cl. 219-69.00W.

Takasaki, Masaru: *See*—
Takatsuji, Kouichi; and Takasaki, Masaru, 4,674,014, Cl. 362-80.000.

Takasu, Yoshio: *See*—
Katagiri, Kazuhara; Oguchi, Yoshihiro; Ohtake, Takeshi; Arao, Kozo; Kitahara, Makoto; and Takasu, Yoshio, 4,673,630, Cl. 430-72.000.

Takatsu, Tamao: *See*—
Shin, Shigeo; Takatsu, Tamao; Saito, Teiichiro; Kikuchi, Akiyoshi; and Nakanishi, Tsuneo, 4,673,123, Cl. 228-263.130.

Takatsuji, Kouichi; and Takasaki, Masaru, to Nissan Motor Co., Ltd. Mounting structure for vehicular lighting unit. 4,674,014, Cl. 362-80.000.

Takayama, Akira: *See*—
Tadachi, Akio; and Takayama, Akira, 4,673,895, Cl. 331-99.000.

Takeda Chemical Industries, Ltd.: *See*—
Matsuo, Taisuke, deceased; Ochiai, Michihiko; and Kishimoto, Shoji, 4,673,739, Cl. 540-355.000.
Taniguchi, Shin ichi, 4,673,077, Cl. 198-393.000.

Takeda, Mitsuru; and Kuramochi, Wataru, to Dai Nippon Insatsu Kabushiki Kaisha. Optical recording card with optical recording layers. 4,673,626, Cl. 430-14.000.

Takeda, Tomoyuki; and Ito, Yoji, to Murata Manufacturing Co., Ltd. Dielectric material coaxial resonator filter directly mountable on a circuit board. 4,673,902, Cl. 333-202.000.

Takekura, Hiroyuki: *See*—
Kitamura, Masatsugu; Tanaka, Mitsuaki; and Takekura, Hiroyuki, 4,673,916, Cl. 340-347.0SH.

Takemoto, Tadashi: *See*—
Hisamitsu, Kunio; Takemoto, Tadashi; Yukawa, Toshihide; and Hisamitsu, Kunio, 4,673,744, Cl. 544-385.000.

Takenouchi, Shigeki: *See*—
Yamazaki, Toshinori; Nakanishi, Tatsuo; Marukawa, Yuji; Takenouchi, Shigeki; and Nomori, Hiroyuki, 4,673,629, Cl. 430-58.000.

Takeuchi, Morihisa: *See*—
Uchikawa, Fusaoki; Takeuchi, Morihisa; Shimamoto, Kozo; Miyao, Kunihiko; Momiyama, Kimio; and Watarai, Hisao, 4,673,910, Cl. 338-35.000.

Takeuchi, Tadashi; and Ushida, Kunihiro, to NGK Spark Plug Co., Ltd. Vibration sensor. 4,672,839, Cl. 73-35.000.

Takeya, Eisaku: *See*—
Yokoi, Tatsuhisa; Takeya, Eisaku; Hattori, Kyo; Abe, Kazuo; and Osawa, Hideyuki, 4,672,939, Cl. 123-568.000.

Takezawa, Makoto: *See*—
Shoji, Toru; Sugiyama, Mitsuru; Takezawa, Makoto; Akiba, Yuichi; Kaneko, Akira; and Sato, Mituo, 4,673,596, Cl. 427-262.000.

Taki, Hideo: *See*—
Sadaki, Hiroshi; Narita, Hirokazu; Imaizumi, Hiroyuki; Konishi, Yoshinori; Inaba, Takihiro; Hirakawa, Tatsuo; Taki, Hideo; Tai, Masaru; Watanabe, Yasuo; and Saikawa, Isamu, 4,673,738, Cl. 540-222.000.

Takizawa, Masahiro: *See*—
Kajimoto, Noribumi; Kawakami, Yoshio; and Takizawa, Masahiro, 4,673,622, Cl. 428-423.100.

Takizawa, Shozo: *See*—
Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Kumagai, Naotake; and Tatemoto, Minoru, 4,673,193, Cl. 280-707.000.

Talbot, Robert E.: *See*—
Davis, Keith P.; and Talbot, Robert E., 4,673,509, Cl. 210-699.000.

Tallman, Peter H.: *See*—
Breisford, David P.; Cerutti, Daniel D.; Coleman, Leslie S.; Davison, Gerald A.; Dewey, Pamela H.; Enichen, Margaret C.; Hartley, Sarah T.; Malmowski, Paul A.; Rogers, Roger W.; Tallman, Peter H.; and Czak, Lynn A., 4,674,038, Cl. 364-200.000.

Talmage, Joseph M., to Warner-Lambert Company. Composition for determining peroxidase-like activity of hemoglobin. 4,673,654, Cl. 436-66.000.

Tam, Le Dinh C.; Garceau, Roger; and Leblanc, Andre, to Centre de Recherche Industrielle du Quebec. Multiple frequency adaptive noise filter for removing interference signals from a frequency band having a desired signal. 4,673,982, Cl. 358-167.000.

Tamano, Michio; and Kawasaki, Yoshiaki, to Fujitsu Limited. Connector pin inserter. 4,672,735, Cl. 29-564.600.

Tamari, Vladimir F. Mechanical perspective drafting device. 4,672,749, Cl. 33-18.300.

Tamaru, Sinji: *See*—
Yamashita, Hiroshi; Fujii, Kanenaga; Hayakawa, Junji; Komiyama, Toru; and Tamaru, Sinji, 4,673,243, Cl. 350-96.150.

Tanabe, Hiroshi; Yamamoto, Etsuo; Togashi, Seigo; Sekiguchi, Kanetaka; Aota, Katsumi; and Sorimachi, Kazuaki, to Citizen Watch Co., Ltd. Method of making a liquid crystal display with color filters. 4,673,253, Cl. 350-339.00F.

Tanaka, Katsuhiko: *See*—
Fukumoto, Hiroshi; Tanaka, Katsuhiko; and Kawagishi, Yoji, 4,673,631, Cl. 430-110.000.

Tanaka, Minoru: *See*—
Satoh, Ryohei; Oshima, Muneo; Tanaka, Minoru; Sakaguchi, Suguru; Murata, Akira; and Hirota, Kazuo, 4,673,772, Cl. 174-52.0FP.

Tanaka, Mitsuaki: *See*—
Kitamura, Masatsugu; Tanaka, Mitsuaki; and Takekura, Hiroyuki, 4,673,916, Cl. 340-347.0SH.

Tanaka, Osami; Tagami, Tomoyuki; and Tsunoda, Kazuhiko, to Honda Giken Kogyo Kabushiki Kaisha. Frame-rear suspension assembly for a motorcycle and the like. 4,673,053, Cl. 180-227.000.

Tanaka, Shigeru, to Du Pont de Nemours, E. I., and Company. Apparatus for operating cycloconverters in parallel fashion. 4,673,823, Cl. 307-11.000.

Tanaka, Shigeru, to Kabushiki Kaisha Toshiba. Delta-connected circulating current cycloconverter apparatus. 4,674,026, Cl. 363-160.000.

Tanaka, Tadao: *See*—
Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Kumagai, Naotake; and Tatemoto, Minoru, 4,673,193, Cl. 280-707.000.

Tanaka, Takahiko: *See*—
Tsunoda, Akira; Tanaka, Takahiko; and Handa, Noboru, 4,673,853, Cl. 318-443.000.

Tanaka, Takeshi: *See*—
Kanazawa, Hirotaka; Tanaka, Takeshi; Furutani, Shigeki; and Miyoshi, Akihiko, 4,673,189, Cl. 280-91.000.

Taniguchi, Masato; Nishio, Hisaharu; Kawamura, Mitsuyoshi; and Okumura, Toshio, to 501 NGK Spark Plug Co. Ltd. Precombustion chamber with insulating means. 4,672,933, Cl. 123-270.000.

Taniguchi, Nobuyuki: *See*—
Nakai, Masaaki; Sahara, Masayoshi; and Taniguchi, Nobuyuki, 4,673,275, Cl. 354-412.000.

Taniguchi, Shin ichi, to Takeda Chemical Industries, Ltd. Article supply apparatus. 4,673,077, Cl. 198-393.000.

Taniguchi, Takao: *See*—
Moroto, Shuzo; Taniguchi, Takao; and Sakakibara, Shiro, 4,673,071, Cl. 192-3.210.

Taniguchi, Yasutaka: *See*—
Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Kumagai, Naotake; and Tatemoto, Minoru, 4,673,193, Cl. 280-707.000.

Taniuchi, Kazuman: *See*—
Miyata, Takahide; Iwashita, Kanau; Taniuchi, Kazuman; Yamamoto, Hitoshi; and Nakamichi, Katsuhiro, 4,672,925, Cl. 123-65.0PE.

Tanno, Norihiko: *See*—
Ishizumi, Kikuo; Ohashi, Naohito; Tanno, Norihiko; Sato, Hiromi; Fukui, Masaru; and Morisada, Shinya, 4,673,668, Cl. 514-34.000.

Tanno, Tomiya: *See*—
Yoshida, Daisuke; Tanno, Tomiya; and Fukunaga, Takeshi, 4,672,811, Cl. 60-449.000.
Tardy, Michel: *See*—
Tayot, Jean-Louis; and Tardy, Michel, 4,673,734, Cl. 530-364.000.
Tasaki, Takashi: *See*—
Kubota, Teruo; and Tasaki, Takashi, 4,673,232, Cl. 439-441.000.
Tash, George. Conduit flushing device. 4,672,988, Cl. 134-167.00C.
Tashita, Junichi: *See*—
Uchida, Teruyoshi; Yamamori, Hisayoshi; Kojima, Hirotaka; and Tashita, Junichi, 4,672,970, Cl. 128-635.000.
Tashkentskoe Spetsialnoe Konstruktorskoe Bjuro Textilnykh Mashin: *See*—
Abduganiev, Aburakhim; Zhigalov, Gennady V.; and Batalkina, Tatyana M., 4,672,801, Cl. 57-86.000.
Tateisi, Kazuma: *See*—
Ohmae, Kenichi; Tateisi, Kazuma; Shinohara, Yoshitsugu; and Ueno, Nobuyuki, 4,673,802, Cl. 235-379.000.
Tatemoto, Minoru: *See*—
Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Kumagai, Naotake; and Tatemoto, Minoru, 4,673,193, Cl. 280-707.000.
Tatezaki, Junichi: *See*—
Funabashi, Tsuneo; Iwasaki, Kazuhiko; Yamaguchi, Noboru; Shimura, Takanori; and Tatezaki, Junichi, 4,674,037, Cl. 364-200.000.
Taylor, Julian D.: *See*—
Puresevic, Peter J.; Taylor, Julian D.; and O'Sullivan, Denis, 4,673,095, Cl. 215-220.000.
Taylor, Mark P.: *See*—
Gadkaree, Kishor P.; Montierth, Max R.; and Taylor, Mark P., 4,673,658, Cl. 501-89.000.
Taylor, Richard H. Ferrule extractor. 4,672,731, Cl. 29-259.000.
Taylor, Ritchie S. Maritime wind shift alarm system and method of detecting wind shifts. 4,673,924, Cl. 340-601.000.
Tayot, Jean-Louis; and Tardy, Michel, to Institut Merieux. Porous mineral support coated with an aminated polysaccharide polymer. 4,673,734, Cl. 530-364.000.
TBL Development Corporation: *See*—
Towns, Edward J.; Brown, Edward M.; and Lester, William M., 4,673,096, Cl. 215-230.000.
TDK Electronics Co., Ltd.: *See*—
Kajimoto, Noribumi; Kawakami, Yoshio; and Takizawa, Masahiro, 4,673,622, Cl. 428-423.100.
Technic Inc.: *See*—
Morrissey, Ronald J.; and Kroll, Harry, 4,673,472, Cl. 204-44.600.
Technicare Corporation: *See*—
Compton, Russell A.; Keller, John T.; McBride, Thomas R.; and Kramer, David M., 4,673,880, Cl. 324-309.000.
Tecnol, Inc.: *See*—
Hubbard, Vance M.; and Brunson, Welton K., 4,673,084, Cl. 206-438.000.
Teikoku Hormone Mfg. Co., Ltd.: *See*—
Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, 4,673,692, Cl. 514-583.000.
Tektronix, Inc.: *See*—
Cunningham, Howard G., Jr., 4,673,931, Cl. 340-722.000.
Jenness, Timothy A., 4,673,986, Cl. 358-242.000.
Pepper, Steven H., 4,673,824, Cl. 307-64.000.
Veenendaal, Cornelis T., 4,673,839, Cl. 310-338.000.
Teledyne Industries, Inc.: *See*—
Smith, Raymond, 4,673,332, Cl. 415-113.000.
Telefonaktiebolaget L M Ericsson: *See*—
Forrest, John R., 4,673,939, Cl. 342-174.000.
Telefunken electronic GmbH: *See*—
Angerstein, Jorg; Wagner, Elmar; and Dermitzakis, Stefanos, 4,674,093, Cl. 372-38.000.
Telephone Products, Inc.: *See*—
Ditzig, Albert, 4,673,228, Cl. 439-21.000.
Telex Computer Products, Inc.: *See*—
Flanagin, Stephen D.; Bubb, Howard G.; and Scantlin, John R., 4,674,082, Cl. 370-60.000.
Tenma, Tsutomu: *See*—
Iwashita, Masao; and Tenma, Tsutomu, 4,674,034, Cl. 364-200.000.
Terada, Atsusuke; and Wachi, Kazuyuki, to Sankyo Company, Limited. Process for preparing anti-inflammatory cycloalkylidenemethylphenylacetic acid derivatives. 4,673,761, Cl. 562-459.000.
Terada, Kosei: *See*—
Sugiyama, Jun; Suzuki, Akira; Terada, Kosei; Oguri, Shigenori; and Ishii, Shigeki, 4,672,876, Cl. 84-1.030.
Terada, Seiji: *See*—
Orihashi, Tadaaki; Tsuji, Hiroshi; Ogawa, Kazuhiko; Hayashitani, Masao; Terada, Seiji; Miyagawa, Tsugio; and Isozaki, Hideo, 4,673,486, Cl. 208-86.000.
Teraoka Seiko Company Limited: *See*—
Matsuura, Yoshikazu, 4,673,046, Cl. 177-1.000.
Terase, Kunihiko: *See*—
Senoue, Makoto; Terase, Kunihiko; and Nakaya, Keiichi, 4,673,558, Cl. 423-240.000.
Terlizzi, Frank M., Jr.; and Langen, Bernardus G., to W. R. Grace & Co. Molded meat vacuum packaging. 4,672,793, Cl. 53-434.000.
Terumo Corporation: *See*—
Wakabayashi, Toshio; Takai, Makoto; Ichikawa, Shuji; Arai, Junichiro; and Murota, Seiitsu, 4,673,684, Cl. 514-327.000.
Terumo Kabushiki Kaisha: *See*—
Igarashi, Takeshi; Endo, Toshihiko; and Koshi, Isei, 4,673,636, Cl. 435-34.000.
Suzuki, Tatsuo; and Matsumoto, Atsushi, 4,673,393, Cl. 604-167.000.
Tessler, Martin M.: *See*—
Tsai, John J.; and Tessler, Martin M., 4,673,707, Cl. 525-54.200.
Texaco Inc.: *See*—
Paslean, James H.; and Steele, Charles S., 4,673,762, Cl. 564-497.000.
Texas Instruments Incorporated: *See*—
Bayraktaroglu, Burhan, 4,673,958, Cl. 357-13.000.
Chatterjee, Pallab K.; and Shah, Ashwin H., 4,673,962, Cl. 357-23.600.
Hingorany, Premkumar, 4,673,967, Cl. 357-70.000.
Hynecek, Jaroslav, 4,673,963, Cl. 357-24.000.
Maytum, Michael J.; and Lear, Anthony, 4,673,844, Cl. 315-200.00R.
Porter, Vernon R.; and Baber, Samuel C., 4,673,592, Cl. 427-53.100.
Szczepanek, Andre; and Hubbins, Stephen, 4,674,086, Cl. 370-86.000.
Textron Inc.: *See*—
Ryder, Francis E.; and Lisak, Stephen P., 4,674,018, Cl. 362-424.000.
Thanh, Truong D., to Kabushiki Kaisha Toshiba. Circuit substrate. 4,673,660, Cl. 501-135.000.
Theeuwes, Felix: *See*—
Guittard, George V.; Deters, Joseph C.; Theeuwes, Felix; and Cortese, Richard, 4,673,405, Cl. 604-890.000.
Theriault, Kenneth T., to Lori Corporation. Key-in-knob cylinder replacement system. 4,672,828, Cl. 70-373.000.
Thirumalachar, Mandayam J.; Narasimhan, Mandayam J.; and Thirumalachar, Mandayam J. K., to Source Technology Biologicals, Inc. New chemotherapeutic agents for the control of plant and animal diseases. 4,673,687, Cl. 514-460.000.
Thirumalachar, Mandayam J. K.: *See*—
Thirumalachar, Mandayam J.; Narasimhan, Mandayam J.; and Thirumalachar, Mandayam J. K., 4,673,687, Cl. 514-460.000.
Thomas & Betts Corporation: *See*—
Logan, Maurus C.; and Sladen, Francis, 4,673,242, Cl. 350-96.200.
Thomas Equipment Ltd.: *See*—
Burke, Raymond W.; Tiedke, Herman W. B.; and Barton, Brian C., 4,673,054, Cl. 180-271.000.
Thomas, Richard A.; and Eggleston, Ross W., to Ratcom, Inc. Flow cytometry. 4,673,288, Cl. 356-72.000.
Thomas, Thomas J.: *See*—
Sandefur, Charles W.; and Thomas, Thomas J., 4,673,410, Cl. 8-528.000.
Thominet, Michel; Acher, Jacques; and Monier, Jean-Claude, to Societe d'Etudes Scientifiques et Industrielle de l'Ile de France. New substituted heterocyclic benzamides, methods of preparing them and their application as behavior modifiers. 4,673,686, Cl. 514-359.000.
Thompson, Fayette. Adjustable fishing float. 4,672,769, Cl. 43-43.110.
Thompson, James E.: *See*—
Beers, M. Dale; and Thompson, James E., 4,673,750, Cl. 549-215.000.
Thompson, Jeffrey L.: *See*—
Patton, Wesley H.; and Thompson, Jeffrey L., 4,673,854, Cl. 318-649.000.
Thompson, Lester: *See*—
Vandewege, Orville, 4,673,113, Cl. 223-15.000.
Thompson, Phillip E.; and Dietrich, Harry B., to United States of America, Navy. Method of forming thermally stable high resistivity regions in n-type indium phosphide by oxygen implantation. 4,673,446, Cl. 148-33.000.
Thomson CSF: *See*—
Gerard, Jean L.; and Bricot, Claude, 4,674,081, Cl. 369-275.000.
Hehlen, Robert; Hareng, Michel; Le Berre, Serge; and Mourey, Bruno, 4,673,256, Cl. 350-350.00S.
Thorn, Brent A.: *See*—
Riera, Frank J.; and Thorn, Brent A., 4,672,866, Cl. 81-57.370.
Tidwell, John H. Air cleaning system. 4,673,422, Cl. 55-248.000.
Tie/Communications, Inc.: *See*—
Tosto, Roger J., 4,674,118, Cl. 379-393.000.
Tiedke, Herman W. B.: *See*—
Burke, Raymond W.; Tiedke, Herman W. B.; and Barton, Brian C., 4,673,054, Cl. 180-271.000.
Till, Wolfgang: *See*—
Ehrmann-Falkenau, Ekkehard; Veith, Richard; and Till, Wolfgang, 4,673,901, Cl. 333-196.000.
Tinti, Jean M.: *See*—
Nofre, Claude; and Tinti, Jean M., 4,673,582, Cl. 426-548.000.
Titus, John D.: *See*—
Bai, Monty W.; Titus, John D.; and Farace, Louis P., 4,673,777, Cl. 200-61.45R.
Toa Nenryo Kabushiki Kaisha: *See*—
Itaba, Yasushi; Yoshino, Tadao; Yoshifuji, Yutaka; Saito, Keichiro; and Tabuchi, Jyoichi, 4,673,619, Cl. 428-338.000.
Tocco, Inc.: *See*—
Vickers, Robert V., 4,673,784, Cl. 219-10.570.
Todorov, Dimiter T.; Djudjev, Slavtcho G.; and Yarumov, Kiril D., to V M E I "Lenin" . Converter of the rate of flow of a fluid. 4,672,854, Cl. 73-861.330.

Togashi, Seigo: *See*—
Tanabe, Hiroshi; Yamamoto, Etsuo; Togashi, Seigo; Sekiguchi, Kanetaka; Aota, Katsumi; and Sorimachi, Kazuaki, 4,673,253, Cl. 350-339.00F.

Tokoro, Setsuo; Shigematsu, Takashi; and Watanabe, Tomoyuki, to Toyota Jidosha Kabushiki Kaisha. Hydraulic control apparatus for a continuously variable transmission. 4,673,378, Cl. 474-18.000.

Tokuda, Hiroatsu: *See*—
Shioya, Makoto; Sekozawa, Teruji; Funabashi, Motohisa; Ishida, Masahiro; and Tokuda, Hiroatsu, 4,674,028, Cl. 364-148.000.

Tokuhara, Masaharu: *See*—
Sarugaku, Toshio; Motoe, Hisafumi; Tokuhara, Masaharu; and Hongu, Masayuki, 4,673,983, Cl. 358-183.000.

Tokyo Electric Co., Ltd.: *See*—
Takaishi, Kazuaki, 4,673,856, Cl. 318-696.000.

Tokyo Keiki Co., Ltd.: *See*—
Kato, Kuniaki; and Takahashi, Mutsumi, 4,673,254, Cl. 350-345.000.

Tokyo Kogaku Kikai Kabushiki Kaisha: *See*—
Takahashi, Susumu, 4,673,264, Cl. 351-211.000.

Tokyo Roki Co., Ltd.: *See*—
Fujimoto, Etsuo, 4,673,503, Cl. 210-493.100.

Tolley, Patrick, to Hydracine Fluid Power Limited. Digital servo-valve. 4,673,160, Cl. 251-129.050.

Tomimoto, Masami: *See*—
Okamura, Masayoshi; Matsuda, Kiyoshi; Yamada, Hiromichi; Umeda, Hiromi; and Tomimoto, Masami, 4,673,655, Cl. 436-75.000.

Tomiuchi, Shinichi: *See*—
Akasaka, Tamotsu; Tomiuchi, Shinichi; Seto, Kazuo; Matsui, Kenichi; and Sawada, Yasushi, 4,673,543, Cl. 264-82.000.

Tomka, Ivan: *See*—
Wittwer, Fritz; and Tomka, Ivan, 4,673,438, Cl. 106-126.000.

Tomohiro, Susumu; Arai, Yuko; and Mineura, Kazuyuki, to Kyowa Hakko Kogyo Co., Ltd. Process and microorganisms for producing mitomycin A by fermentation. 4,673,645, Cl. 435-119.000.

Tomy Kogyo Co., Inc.: *See*—
Furukawa, Masami, 4,673,371, Cl. 446-175.000.

Tonouchi, Akira: *See*—
Kagechika, Hiroshi; Tonouchi, Akira; and Kammel, Roland, 4,673,471, Cl. 204-44.500.

Topper, Robert J.: *See*—
Dischert, Robert A.; Topper, Robert J.; and Shyu, William M., 4,673,978, Cl. 358-140.000.

Torgerson, Darrel D.: *See*—
Patton, Gail Y.; and Torgerson, Darrel D., 4,674,011, Cl. 362-32.000.

Tornau, Johannes: *See*—
Nordsiek, Karl-Heinz; Wolpers, Jurgen; and Tornau, Johannes, 4,673,709, Cl. 525-99.000.

Tosaka, Yoichi: *See*—
Suzuki, Masayuki; Ohara, Tsunemasa; Tosaka, Yoichi; Kobayashi, Ryuichi; Harada, Yoshihito; and Kawamura, Masaharu, 4,673,272, Cl. 354-173.110.

Toscano, Luciano, to Pierrel SpA. Process for the preparation of (8S)-8-fluoroerythromycins. 4,673,736, Cl. 536-7.200.

Toschi Produktions-Gesellschaft mbH: *See*—
Klauss, Heinrich; and Baarsch, Kurt, 4,673,538, Cl. 261-112.000.

Toshiba Ceramics Co., Ltd.: *See*—
Yamaguchi, Masayoshi; Meguro, Kazunori; Matsuo, Shuitsu; and Sasaki, Yasumi, 4,673,435, Cl. 75-235.000.

Toshiba Kikai Kabushiki Kaisha: *See*—
Bannai, Saburo; and Kawashima, Kiyoshi, 4,674,053, Cl. 364-476.000.

Tosto, Roger J., to Tie/Communications, Inc. Telephone line hold and hold release apparatus. 4,674,118, Cl. 379-393.000.

Toth, James M.: *See*—
Harris, Richard M.; Valek, David A.; Toth, James M.; and Abramczyk, Richard F., 4,673,879, Cl. 324-240.000.

Toth, Klara S.: *See*—
Pungor, Erno; Toth, Klara S.; Feher, Zsofia; Nagy, Geza; and Horvai, Gyorgy, 4,673,295, Cl. 356-440.000.

Towns, Edward J.; Brown, Edward M.; and Lester, William M., to TBL Development Corporation. Closure and rotatable liner. 4,673,096, Cl. 215-230.000.

Townsend, Garnold: *See*—
Hagar, Donald K.; Kennedy, Curtis V.; and Townsend, Garnold, 4,673,026, Cl. 165-9.000.

Toyama, Noboru: *See*—
Yamawaki, Seiichi; Obuchi, Tomoki; Toyama, Noboru; and Shogen, Kazuyoshi, 4,673,905, Cl. 333-239.000.

Toyo Boseki Kabushiki Kaisha: *See*—
Endoh, Seiji; Kimura, Kunio; Ohta, Toshihiko; and Kato, Yasuo, 4,673,724, Cl. 528-206.000.

Toyogucyi, Tsutomu: *See*—
Higuchi, Kunio; Miyazono, Shunichi; and Toyogucyi, Tsutomu, 4,674,080, Cl. 369-77.200.

Toyokawa, Kazuhara, to International Business Machines Corporation. Compressed block code for facsimile transmission. 4,673,987, Cl. 358-260.000.

Toyota Jidosha Kabushiki Kaisha: *See*—
Buma, Shuuichi, 4,673,171, Cl. 267-8.00R.
Itoh, Hiroshi; and Takada, Mitsuru, 4,672,863, Cl. 74-866.000.
Nishiyama, Yuji; Kitano, Tateo; and Hashimoto, Masakazu, 4,673,217, Cl. 297-473.000.
Saito, Muneo; and Hayakawa, Shoichi, 4,673,921, Cl. 340-539.000.
Tokoro, Setsuo; Shigematsu, Takashi; and Watanabe, Tomoyuki, 4,673,378, Cl. 474-18.000.
Yamazawa, Yasushi; Kondo, Katsumi; Tsutiya, Yasuhiro; Niimi, Takatsune; Yamamoto, Takashi; and Matsuba, Kunihiro, 4,673,451, Cl. 156-172.000.
Yokoi, Tatsuhisa; Takeya, Eisaku; Hattori, Kyo; Abe, Kazuo; and Osawa, Hideyuki, 4,672,939, Cl. 123-568.000.

Toyota Jidosha Kabushiki Kaisha Toyo Tire & Rubber Co., Ltd.: *See*—
Matsuno, Yutaka; Hatanaka, Yasunori; Shimizu, Hirokazu; Ishigaki, Masahiro; Harada, Hiroshi; Kawada, Michihiro; and Wakita, Yasukuni, 4,673,188, Cl. 277-212.0FB.

Toyota Motor Corporation: *See*—
Hosono, Chihiro; Hayakawa, Yoichi; Kubo, Seitoku; Taga, Yutaka; and Nakamura, Shinya, 4,673,072, Cl. 192-3.570.

Tracy, John G.: *See*—
Raddi, William J.; Johnson, Robert W., Jr.; Tracy, John G.; and Sonnenberg, Blazej W., 4,673,825, Cl. 307-66.000.

Tragen, Barry J., to Microscience Corporation. Method and apparatus for facilitating production of electronic circuit boards. 4,674,007, Cl. 361-404.000.

Trahan, Francis B. Golf playing field with ball detecting radar units. 4,673,183, Cl. 273-176.00A.

Trapp, Donald P.: *See*—
Swiatlowski, George J.; Trapp, Donald P.; Liescheidt, Duane B.; McDaniel, Arden G.; and Brandt, Maurice W., 4,673,078, Cl. 198-450.000.

Traub GmbH: *See*—
Hasslauer, Heinz; and Gawronski, Seweryn, 4,672,869, Cl. 82-2.500.

Travis, Tonny D. Mine dusting machine. 4,673,131, Cl. 239-673.000.

Triatex International AG: *See*—
Bors, Hans; Egger, Peter; Gotz, Albert; and Schwemmer, Martin, 4,672,705, Cl. 8-151.000.

Tribe, Leonard T.: *See*—
Every, Peter; Atkins, Thomas M.; Miller, Roger L.; and Tribe, Leonard T., 4,673,226, Cl. 303-109.000.

Trivedi, Bharat K.: *See*—
Hamilton, Harriet W.; Patt, William C.; and Trivedi, Bharat K., 4,673,670, Cl. 514-46.000.

Trojan, Donald R.: *See*—
Kalmus, Leslie P.; Trojan, Donald R.; Mott, Bradley; and Strampfer, John, 4,674,044, Cl. 364-408.000.

Trutter, Walter P.: *See*—
Schrom, Ralf-Henning; and Trutter, Walter P., 4,672,730, Cl. 29-241.000.

TRW Inc.: *See*—
Graham, Lawrence D.; Skelley, Richard A.; Fetsko, Daniel G.; and Ardo, Ronald, 4,673,021, Cl. 164-122.000.

TRW Probe Electronics Co. Ltd.: *See*—
Harbour, John, 4,673,047, Cl. 177-136.000.

Tsai, Chung-Chieh, to Ashland Oil, Inc. Thermoset molding compositions. 4,673,696, Cl. 521-172.000.

Tsai, John J.; and Tessler, Martin M., to National Starch and Chemical Corporation. Synthetic polymers with glycoside side chains. 4,673,707, Cl. 525-54.200.

Tsubura, Shinichi: *See*—
Ozeki, Takeshi; and Tsubura, Shinichi, 4,674,046, Cl. 364-414.000.

Tsuchida, Tetsuo: *See*—
Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 4,673,221, Cl. 303-6.00R.

Tsuchiyama, Yuji: *See*—
Kogure, Tsuneo; Tsuchiyama, Yuji; Amano, Tadashi; Takahashi, Hideaki; Sekita, Katsuji; and Akami, Ichio, 4,672,831, Cl. 72-21.000.

Tsuji, Hiroshi: *See*—
Orihashi, Tadaaki; Tsuji, Hiroshi; Ogawa, Kazuhiko; Hayashitani, Masao; Terada, Seiji; Miyagawa, Tsugio; and Isozaki, Hideo, 4,673,486, Cl. 208-86.000.

Tsuji, Sadahiko, to Canon Kabushiki Kaisha. Compact finder. 4,673,262, Cl. 350-538.000.

Tsukamoto, Hidehiko; Kohmoto, Eiji; Asada, Koichi, deceased (by Asada, Kuniko, legal representative); Yamasaki, Masakuni; Matsumoto, Kenichi; Nakazono, Euji; Wakamiya, Yoshinori; and Kuramoto, Satoru, to Mitsubishi Jukogyo Kabushiki Kaisha; and Mitsubishi Denki Kabushiki Kaisha. Method of controlling an edging opening in a rolling mill. 4,672,830, Cl. 72-8.000.

Tsukamoto, Jun: *See*—
Matsumura, Kiichiro; Takahashi, Akio; and Tsukamoto, Jun, 4,673,720, Cl. 526-285.000.

Tsukamoto, Masa. Power-operated, extendible and retractible cover for truck beds. 4,673,208, Cl. 296-98.000.

Tsunoda, Akira; Tanaka, Takahiko; and Handa, Noboru, to Asmo Co., Ltd. Concealed wiper system. 4,673,853, Cl. 318-443.000.

Tsunoda, Kazuhiko: *See*—
Tanaka, Osami; Tagami, Tomoyuki; and Tsunoda, Kazuhiko, 4,673,053, Cl. 180-227.000.

Tsunoda, Susumu: *See*—
Yamada, Hideo; Ichiki, Shigemi; Naniwa, Hisamoto; Uchida, Susumu; Kadokura, Kenji; Tsunoda, Susumu; and Nakajima, Kunio, 4,674,127, Cl. 383-6.000.

Tsurumoto, Kazuo: *See*—
Ozaki, Yoshio; and Tsurumoto, Kazuo, 4,673,789, Cl. 219-69.00W.

Tsushima, Noburu; Fuse, Masashi; Mimori, Teruo; Sasaki, Toshio; and Mukai, Tadashi, to Alps Electric Co., Ltd. Vehicle location display device with averaging means for correcting location information. 4,673,878, Cl. 324-226.000.

Tsushima, Shuuichi: *See*—
Matsumoto, Fuyuhiko; and Tsushima, Shuuichi, 4,673,284, Cl. 355-15.000.

Tsutiya, Yasuhiro: *See*—
Yamazawa, Yasushi; Kondo, Katsumi; Tsutiya, Yasuhiro; Niimi, Takatsune; Yamamoto, Takashi; and Matsuba, Kunihiro, 4,673,451, Cl. 156-172.000.

Tsutsui, Mitsukuni: *See*—
Uchiyama, Kaoru; and Tsutsui, Mitsukuni, 4,672,847, Cl. 73-204.000.

Tuboi, Masayoshi: *See*—
Anahara, Meiji; Muramatsu, Shigeru; Takagi, Isamu; and Tuboi, Masayoshi, 4,672,804, Cl. 57-401.000.

Tufts, Wesley M.: *See*—
Heinze, Walter O.; and Tufts, Wesley M., 4,672,689, Cl. 4-415.000.

Tukamoto, Susumu: *See*—
Irie, Hirosada; and Tukamoto, Susumu, 4,673,794, Cl. 219-121.0ED.

Turbo-Luft-Technik GmbH: *See*—
Kolb, Werner, 4,673,331, Cl. 415-53.00R.

Turner, Eleanor. Magnetic device for aiding scaled reproduction of pictorial images in needlework. 4,672,747, Cl. 33-1.00K.

Turner, Kenneth R.; and Ashe, James A. Suction device for use with tracheostomy tube. 4,673,398, Cl. 604-264.000.

Turner, Paul F., to BSD Medical Corporation. System and method for creating hyperthermia in tissue. 4,672,980, Cl. 128-804.000.

Turner, Ralph W., Jr. Drum filter take-off. 4,673,496, Cl. 210-232.000.

Turner, Robert. Providing of gases for an excimer laser. 4,674,098, Cl. 372-59.000.

Turner, Robert B.; Peters, Kenneth D.; and Bennett, Richard W., to UOP Inc. Hydrocarbon-conversion process with fractionator overhead vapor recycle. 4,673,488, Cl. 208-101.000.

Turner, Robert E. Recycling of gases for an excimer laser. 4,674,099, Cl. 372-59.000.

Turner, William H.; and Slaughter, Ivan K., to Otis Engineering Corporation. Connector for well servicing system. 4,673,041, Cl. 166-340.000.

Tuttle, James N., Jr.; and Jaboin, Olyn P., to LEA Manufacturing Company, The. Corrosion resistant coating. 4,673,445, Cl. 148-6.15R.

Twizell, Norman: *See*—
Swinney, Denis P.; Twizell, Norman; and Fergusson, Charles W., 4,673,498, Cl. 210-275.000.

Tyler, Lawson J.; and Worsey, Paul N., to University of Missouri, The Curators of the. Integrated detonator delay circuits and firing console. 4,674,047, Cl. 364-423.000.

Ube Industries, Ltd.: *See*—
Nakano, Tsunetomo; Yasuno, Hiroshi; and Nishio, Kazuaki, 4,673,773, Cl. 174-68.500.

Uchida, Hiroyuki: *See*—
Hiasa, Toshikazu; and Uchida, Hiroyuki, 4,672,924, Cl. 123-65.0PE.
Souda, Yutaka; Imakoshi, Shigeyoshi; Suyama, Hideo; Uchida, Hiroyuki; Iida, Yasuhiro; and Sekiya, Tetsuo, 4,673,998, Cl. 360-113.000.

Uchida, Susumu: *See*—
Yamada, Hideo; Ichiki, Shigemi; Naniwa, Hisamoto; Uchida, Susumu; Kadokura, Kenji; Tsunoda, Susumu; and Nakajima, Kunio, 4,674,127, Cl. 383-6.000.

Uchida, Takanao, to Honda Giken Kogyo Kabushiki Kaisha. Valve actuator for internal combustion engine. 4,672,927, Cl. 123-90.440.

Uchida, Teruyoshi; Yamamori, Hisayoshi; Kojima, Hirotaka; and Tashita, Junichi, to Mitsubishi Rayon Company, Ltd. Electrode for living body. 4,672,970, Cl. 128-635.000.

Uchikawa, Fusaoki; Takeuchi, Morihisa; Shimamoto, Kozo; Miyao, Kunihiko; Momiyama, Kimio; and Watarai, Hisao, to Mitsubishi Denki Kabushiki Kaisha. Moisture sensitive element containing high temperature decomposition residue of organo-silicon polymer as sensitive element. 4,673,910, Cl. 338-35.000.

Uchiyama, Kaoru; and Tsutsui, Mitsukuni, to Hitachi, Ltd. Hot-wire flow rate measuring apparatus. 4,672,847, Cl. 73-204.000.

Uchiyama, Shinich: *See*—
Matsumoto, Tokikazu; Nakagawa, Yukio; and Uchiyama, Shinich, 4,673,970, Cl. 358-27.000.

Uchiyama, Soichi; Hayasaka, Toshiaki; and Ohbayashi, Yasuo, to Research Association for Petroleum Alternatives Development. Process for preparing oxygen-containing organic compounds. 4,673,693, Cl. 518-713.000.

Uddeholm Tooling Aktiebolag: *See*—
Roberts, William, 4,673,433, Cl. 75-53.000.

Ude, Werner: *See*—
Siegert, Hermann; and Ude, Werner, 4,673,730, Cl. 528-491.000.

Ueda, Ikuo; Shiokawa, Youichi; and Manabe, Takashi, to Fujisawa Pharmaceutical Co., Ltd. Pyrimidoisoquinoline derivatives useful for treating allergies. 4,673,676, Cl. 514-267.000.

Ueno, Katsuo: *See*—
Dearden, Geoffrey C.; Speare, Edward J.; Ueno, Katsuo; and Jones, Donald N., 4,673,201, Cl. 285-333.000.

Ueno, Nobuyuki: *See*—
Ohmae, Kenichi; Tateisi, Kazuma; Shinohara, Yoshitsugu; and Ueno, Nobuyuki, 4,673,802, Cl. 235-379.000.

Ueno, Takashi: *See*—
Abo, Toshimi; and Ueno, Takashi, 4,672,814, Cl. 60-602.000.

Ueno, Yoshiki: *See*—
Taguchi, Takasi; Ueno, Yoshiki; and Hattori, Tadashi, 4,673,248, Cl. 350-166.000.

Ueyama, Masato; Kanamaru, Takeshi; Shirai, Toshikazu; and Nakano, Kiyoshi, to Mazda Motor Corporation. Working arrangements for performing multiple operations with robots. 4,673,075, Cl. 198-339.100.

Umeda, Hiromi: *See*—
Okamura, Masayoshi; Matsuda, Kiyoshi; Yamada, Hiromichi; Umeda, Hiromi; and Tomimoto, Masami, 4,673,655, Cl. 436-75.000.

Umeno, Masayoshi: *See*—
Kondo, Tatsuhei; Ito, Kaname; Ikeda, Shoichiro; Umeno, Masayoshi; and Ichikawa, Kenji, 4,673,391, Cl. 604-141.000.

Unden, Harald; and Ridder, Sven-Olof. Load-introducing armature as component part of a laminated structural element. 4,673,606, Cl. 428-138.000.

Ungerboeck, Gottfried: *See*—
Chevillat, Pierre R.; Maiwald, Dietrich G.; and Ungerboeck, Gottfried, 4,674,103, Cl. 375-13.000.

Union Camp Corporation: *See*—
Miller, George E., Jr., 4,673,727, Cl. 528-295.500.

Union Carbide Corporation: *See*—
Atkins, Kenneth E., 4,673,706, Cl. 525-31.000.

Union Oil Company of California: *See*—
Young, Donald C., 4,673,522, Cl. 252-87.000.

Unislip, Inc.: *See*—
Peppers, James M., 4,672,786, Cl. 51-241.0VS.

Unisys Corporation: *See*—
Michaelson, Wayne A., 4,674,032, Cl. 364-200.000.

United States Gypsum Company: *See*—
Salvo, E. Vincent, 4,672,785, Cl. 52-241.000.

United States of America
Air Force: *See*—
Colson, William B., 4,674,091, Cl. 372-20.000.
Hannan, Peter W., 4,673,943, Cl. 342-367.000.
Masson, James H., 4,673,826, Cl. 307-66.000.
Patton, Gail Y.; and Torgerson, Darrel D., 4,674,011, Cl. 362-32.000.
Phillips, Robert A.; and Cassidy, Calvin A., 4,673,938, Cl. 342-95.000.

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Artz, Glen D.; and Grant, Louis R., 4,673,528, Cl. 252-188.250.
Barley, Thomas A.; Hodgens, Tony D.; and Rast, Gustaf J., Jr., 4,673,940, Cl. 342-192.000.
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Roberts, Thomas G.; and Honeycutt, Thomas E., 4,673,250, Cl. 350-320.000.
Sommer, Harold Z.; Owens, Omer O.; and Miller, Jacob I., 4,673,745, Cl. 546-147.000.
Strickland, Brian R.; and Edlin, George R., 4,673,870, Cl. 324-74.000.

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Blessing, Gerald V.; and Flynn, Daniel R., 4,672,851, Cl. 73-597.000.

Energy: *See*—
Aubert, James H.; Clough, Roger L.; Curro, John G.; Quintana, Carlos A.; Russick, Edward M.; and Shaw, Montgomery T., 4,673,695, Cl. 521-64.000.
Betts, William S., Jr.; Pickering, J. Larry; and Black, William E., 4,673,548, Cl. 376-362.000.
Johnson, Steve A.; and Shannon, Robert R., 4,673,290, Cl. 356-73.100.

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Misra, Renuka, 4,673,678, Cl. 514-278.000.
Seto, Belinda; and Gerety, Robert J., 4,673,634, Cl. 435-5.000.

Navy: *See*—
Thompson, Phillip E.; and Dietrich, Harry B., 4,673,446, Cl. 148-33.000.

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Bringmann, Udo; Drews, Klaus; and Schon, Detlef G., 4,673,588, Cl. 427-41.000.
Chua, Lye-Whatt; and Gibson, Peter J., 4,673,897, Cl. 333-26.000.
Dessens, Petrus A.; and Rumphorst, Reiner F., 4,673,864, Cl. 323-221.000.
Heckmann, Siegfried, 4,673,291, Cl. 356-73.100.
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Grant, Michael L., 4,673,771, Cl. 174-38.000.

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Cooper, Adriaan, 4,672,955, Cl. 128-80.00F.
Field, Robert E., 4,672,727, Cl. 29-156.80B.

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Mednis, Juris M., 4,673,094, Cl. 215-10.000.

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Nofre, Claude; and Tinti, Jean M., 4,673,582, Cl. 426-548.000.

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Christian, Clifford N., 4,673,657, Cl. 436-501.000.

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Ramalingam, Subbiah; Qi, Cai B.; and Kim, Kyunghoon, 4,673,477, Cl. 204-192.380.

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Tyler, Lawson J.; and Worsey, Paul N., 4,674,047, Cl. 364-423.000.

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Berne, Robert M.; Belardinelli, Luiz; and Rubio, Rafael, 4,673,563, Cl. 424-9.000.

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Turner, Robert B.; Peters, Kenneth D.; and Bennett, Richard W., 4,673,488, Cl. 208-101.000.

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Takeuchi, Tadashi; and Ushida, Kunihiro, 4,672,839, Cl. 73-35.000.

Ushio Denki Kabushiki Kaisha: *See—*
Okanuma, Tsuneo, 4,673,843, Cl. 313-570.000.

Usinor Aciers: *See—*
Delbecq, Gerard; Markey, Jean-Pierre; Marcq, Bernard; and Val, Rene , 4,672,726, Cl. 29-33.00A.

Utah State University Foundation: *See—*
Keller, Jack; and Stringham, Glen E., 4,673,128, Cl. 239-1.000.

Utex Industries, Inc.: *See—*
Pippert, Aaron J., 4,672,768, Cl. 43-42.090.

V. Kann Rasmussen & Co.: *See—*
Rasmussen, Villum B. K., 4,672,774, Cl. 49-371.000.

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Todorov, Dimiter T.; Djudjev, Slavtcho G.; and Yarumov, Kiril D., 4,672,854, Cl. 73-861.330.

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Valek, David A.: *See—*
Harris, Richard M.; Valek, David A.; Toth, James M.; and Abramczyk, Richard F., 4,673,879, Cl. 324-240.000.

Vallender, Leonard J.: *See—*
Hannon, Charles N.; and Vallender, Leonard J., 4,673,158, Cl. 249-144.000.

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Laapotti, Jorma, 4,673,462, Cl. 162-301.000.

van den Steen, Leon, to Shell Oil Company. Capacitive submergible electrical connector apparatus. 4,674,010, Cl. 361-433.000.

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Vanderlaan, Robert D.; and Meulendyk, John W., to Pneumo Corporation. Direct drive valve-ball drive mechanism. 4,672,992, Cl. 137-331.000.

Van Der Mark, Jacobus, to Hollandse Signaalapparaten B.V. Digital pulse compression filter. 4,673,941, Cl. 342-201.000.

Vanderslice, David. Synthetic fur garland and method of making same. 4,673,599, Cl. 428-10.000.

Vandewege, Orville, to Thompson, Lester. Hat stretcher device. 4,673,113, Cl. 223-15.000.

Van Kampen, Craig L., to Minnesota Mining and Manufacturing Company. Implant with attachment surface. 4,673,409, Cl. 623-23.000.

Van Ketel, Hendrik, to Gusto Engineering C.V. Process for mooring a crane for heavy loads. 4,673,093, Cl. 212-175.000.

VanTosh, Brian H. Method and device for repairing vinyl siding and the like. 4,672,788, Cl. 52-514.000.

Varian Associates, Inc.: *See—*
Lamont, Lawrence T., Jr., 4,673,480, Cl. 204-298.000.

Varma, Ravi K.; Gordon, Eric M.; and Simpkins, Ligaya M., to E. R. Squibb & Sons, Inc. Hydroximic acids of 7-oxabicycloheptane substituted ethers and thioethers useful in the treatment of thrombotic disease. 4,673,685, Cl. 514-333.000.

Varwig, Juergen: *See—*
Hamprecht, Gerhard; Rohr, Wolfgang; and Varwig, Juergen, 4,673,740, Cl. 544-92.000.

Vatzov, Vassil N.; Savov, Krestyo T.; and Stanev, Stefan G., to NPSK PO Poluprovodnikova Technika. Apparatus for coordinate positioning. 4,672,859, Cl. 74-479.000.

Vaughn, Steven T., to General Electric Company. Selectable bit length serial-to-parallel converter. 4,674,064, Cl. 364-900.000.

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Stanford, Raymond A., 4,673,415, Cl. 55-21.000.

VEB Kombinat Walzlager und Normteile: *See—*
Bartko, Kristine; Gabler, Dieter; Heinrich, Peter; Luckner, Joachim; and Schlenkrich, Bernd, 4,672,833, Cl. 72-111.000.

Veenendaal, Cornelis T., to Tektronix, Inc. Piezoelectric pressure sensing apparatus for integrated circuit testing stations. 4,673,839, Cl. 310-338.000.

Veith, Richard: *See—*
Ehrmann-Falkenau, Ekkehard; Veith, Richard; and Till, Wolfgang, 4,673,901, Cl. 333-196.000.

Venkateswaran, Pinayur S.; Millman, Irving; and Blumberg, Baruch S., to Fox Chase Cancer Center. Composition, pharmaceutical preparation and method for treating viral hepatitus. 4,673,575, Cl. 424-195.100.

Vermaat, Huibrecht P., to Brown Boveri Reaktor GmbH. Device for inspection and/or repair of the tubes of a steam generator for nuclear reactors. 4,673,027, Cl. 165-11.200.

Vermeulen-Hollandia Octrooien II B.V.: *See—*
Boots, Robert T., 4,673,210, Cl. 296-221.000.

Veronesi, Luciano: *See—*
Zafred, Paolo R.; Veronesi, Luciano; and Maurer, Robert J., 4,672,741, Cl. 29-726.000.

Verosol USA Inc.: *See—*
Judkins, Ren S., 4,673,018, Cl. 160-84.00R.

Ver Planck, Peter, to Megapulse, Inc. SCR priming and sweep-out circuit apparatus. 4,674,022, Cl. 363-57.000.

Vickers, Robert V., to Tocco, Inc. Valve seat inductor and method of using same. 4,673,784, Cl. 219-10.570.

Vickers Xatal Pty. Ltd.: *See—*
Ward, Noel D., 4,673,613, Cl. 428-247.000.

Victor Company of Japan, Limited: *See—*
Kitamura, Masatsugu; Tanaka, Mitsuaki; and Takekura, Hiroyuki, 4,673,916, Cl. 340-347.0SH.
Namiki, Yasuomi; and Kawasaki, Satoshi, 4,673,991, Cl. 360-14.100.
Tajima, Osamu; and Ito, Shigehiro, 4,674,070, Cl. 369-46.000.

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Alfredsson, Alf I., 4,673,271, Cl. 354-152.000.

Viehe, Heinz G.: *See—*
Roberfroid, Marcel B.; Viehe, Heinz G.; and Hervens, Francoise M., 4,673,690, Cl. 514-563.000.

Vigg, Peter, to AMF Incorporated. Process for the production of a smoking material from cigarette maker winnowings and apparatus. 4,672,982, Cl. 131-290.000.

Vincken, Josef: *See—*
Dietrich, Albert; Katz, Peter; and Vincken, Josef, 4,674,075, Cl. 367-173.000.

Voest-Alpine Aktiengesellschaaft: *See—*
Janusch, Alois; Lugscheider, Walter; and Ludewig, Fritz, 4,673,510, Cl. 210-712.000.

Voest-Alpine Aktiengesellschaft: *See—*
Hauk, Rolf, 4,673,432, Cl. 75-38.000.

Volk, John L.: *See—*
Louie, Chuen W.; Roelofs, Darrell D.; Volk, John L.; and Romeo, Arthur L., 4,673,847, Cl. 315-368.000.

von Ballmoos, Roland: *See—*
Derouane, Eric G.; and von Ballmoos, Roland, 4,673,559, Cl. 423-306.000.

von der Decken, Claus-Benedict: *See—*
Iniotakis, Nicolaos; von der Decken, Claus-Benedict; Hecker, Rudolf; Frohling, Werner; and Schulten, Rudolf, 4,673,547, Cl. 376-314.000.

von Kunszberg, Eberhard: *See—*
Koch, Paul; and von Kunszberg, Eberhard, 4,673,499, Cl. 210-295.000.

Vrzalik, John H. Adjustable pack support bracket. 4,672,952, Cl. 128-33.000.

W&A Bates Limited: *See—*
Goodfellow, Anthony G., 4,673,457, Cl. 156-415.000.

W. R. Grace & Co.: *See—*
Terlizzi, Frank M., Jr.; and Langen, Bernardus G., 4,672,793, Cl. 53-434.000.

W. Schlafhorst & Co.: *See—*
Raasch, Hans, 4,672,802, Cl. 57-263.000.

Wachi, Kazuyuki: *See—*
Terada, Atsusuke; and Wachi, Kazuyuki, 4,673,761, Cl. 562-459.000.

Wacker Werke GmbH & Co. KG: *See—*
Greppmair, Martin, 4,673,043, Cl. 173-162.00H.

Wada, Atsuki; Takahashi, Mikio; and Suhara, Eiji, to Kurashiki Boseki Kabushiki Kaisha. Apparatus for supplying filtered liquid. 4,673,493, Cl. 210-98.000.

Wadsworth, David L., to GTE Communication Systems Corporation. Connector filter adapter. 4,673,237, Cl. 439-607.000.

Wagamitsu, Yasuhiko: *See—*
Miyatake, Yoshito; and Wagamitsu, Yasuhiko, 4,673,841, Cl. 313-35.000.

Wagner, Elmar: *See—*
Angerstein, Jorg; Wagner, Elmar; and Dermitzakis, Stefanos, 4,674,093, Cl. 372-38.000.

Wagner, Horst R., to Horst Reinhold Wagner, Trustee, H&L Wagner Family Trust. Idler roller. 4,673,380, Cl. 474-90.000.

Wahlstrom, Tommy. Method of recharging a rechargeable battery. 4,673,862, Cl. 320-64.000.

Wahnschaffe, Jurgen; Hartmann, Ernst-Siegfried; Casper, Karl-Josef; zur Nieden, Achim; and Schleiermacher, Herbert, to Kloeckner-Humboldt-Deutz AG. Internal combustion engine with at least two liquid cooled cylinders. 4,672,923, Cl. 123-41.740.

Waichunas, Kenneth P.: *See—*
Hoppie, Lyle O.; Chute, Richard; Scharnweber, David H.; and Waichunas, Kenneth P., 4,672,938, Cl. 123-538.000.

Wakabayashi, Masashi: *See—*
Hara, Yoshiaki; and Wakabayashi, Masashi, 4,673,314, Cl. 405-215.000.

Wakabayashi, Noboru: *See—*
Suyama, Hideo; Imakoshi, Shigeyoshi; Soda, Yutaka; Fuse, Takeyuki; Abe, Iwao; and Wakabayashi, Noboru, 4,673,999, Cl. 360-125.000.

Wakabayashi, Toshio; Takai, Makoto; Ichikawa, Shuji; Arai, Junichiro; and Murota, Seiitsu, to Terumo Corporation. Amide derivatives and 5-lipoxygenase inhibitors containing the same as an active ingredient. 4,673,684, Cl. 514-327.000.

Wakahara, Yasuyuki: *See—*
Takagi, Yoshito; Wakahara, Yasuyuki; Hamano, Satoru; Mori, Masanori; Hamaguchi, Masayuki; and Yoshikawa, Naoki, 4,673,838, Cl. 310-239.000.

Wakamiya, Yoshinori: *See—*
Tsukamoto, Hidehiko; Kohmoto, Eiji; Asada, Koichi, deceased; Yamasaki, Masakuni; Matsumoto, Kenichi; Nakazono, Euji; Wakamiya, Yoshinori; and Kuramoto, Satoru, 4,672,830, Cl. 72-8.000.

Wake, Masayoshi; Taguchi, Osamu; and Imaizumi, Mitsuyuki, to Mitsubishi Denki Kabushiki Kaisha. Superconductor. 4,673,774, Cl. 174-94.00R.

Wakita, Yasukuni: *See—*
Matsuno, Yutaka; Hatanaka, Yasunori; Shimizu, Hirokazu; Ishigaki, Masahiro; Harada, Hiroshi; Kawada, Michihiro; and Wakita, Yasukuni, 4,673,188, Cl. 277-212.0FB.

Wako Pure Chemical Industries Ltd.: *See—*
Yamanishi, Kazuhiko; Shintani, Akinori; Okajima, Satoru; and Hanada, Toshiro, 4,673,635, Cl. 435-10.000.

Wald, Roland: *See—*
Moser, Helmut; Greve, Manfred; Pedrazzi, Reinhard; and Wald, Roland, 4,673,735, Cl. 534-606.000.

Walker Enterprises, Inc.: *See—*
Walker, William J., 4,673,186, Cl. 273-399.000.

Walker, John R.: *See—*
Hawe, Malcolm; Marshall, David; and Walker, John R., 4,673,520, Cl. 252-70.000.

Walker, William J., to Walker Enterprises, Inc. Outdoor game and apparatus. 4,673,186, Cl. 273-399.000.

Wallin, Kay, to Sprinter System AB. Arrangement in a sealing machine. 4,672,792, Cl. 53-374.000.

Walsh, Reed H.: *See—*
Stoldt, Stephen H.; and Walsh, Reed H., 4,673,412, Cl. 44-68.000.

Wang, Lawrence C.: *See—*
Herring, Donald E.; and Wang, Lawrence C., 4,673,373, Cl. 446-378.000.

Ward, Billy W.: *See—*
Guarino, Nicholas; Onorio, Gabriel; and Ward, Billy W., 4,673,101, Cl. 220-335.000.

Ward, Frederick E.: *See—*
Buckler, Robert T.; and Ward, Frederick E., 4,673,763, Cl. 564-155.000.

Ward, Noel D., to Vickers Xatal Pty. Ltd. Laminate material comprising polyurethane and metal mesh. 4,673,613, Cl. 428-247.000.

Warmuth, Ivan J.; and Safreed, Carl K., Jr., to Goodyear Tire & Rubber Company, The. Airspring and a method for making airspring flexible members. 4,673,168, Cl. 267-64.270.

Warner Electric Brake & Clutch Company: *See—*
Weatherby, John H., 4,673,073, Cl. 192-35.000.

Warner-Lambert Company: *See—*
Becker, Amy J.; Bagan, James E.; and Medri, Mario W., 4,673,578, Cl. 426-93.000.
Hamilton, Harriet W.; Patt, William C.; and Trivedi, Bharat K., 4,673,670, Cl. 514-46.000.
Talmage, Joseph M., 4,673,654, Cl. 436-66.000.
Wittwer, Fritz; and Tomka, Ivan, 4,673,438, Cl. 106-126.000.

Watanabe, Hiroshi: *See—*
Koshizuka, Kunihiro; Abe, Takao; Kitamura, Shigehiro; and Watanabe, Hiroshi, 4,673,618, Cl. 428-336.000.

Watanabe, Kenji: *See—*
Hirai, Kazumi; Akiyoshi, Mitsuo; Nakano, Chikao; Watanabe, Kenji; and Kodama, Satoru, 4,673,800, Cl. 219-518.000.

Watanabe, Takahiko; Sugano, Toshiyuki; Yamamoto, Yasushi; and Murayama, Kunihiko, to Agency of Industrial Science and Technology. Method and apparatus for continuous shaping of carbon-fiber-reinforced plastic tubes. 4,673,541, Cl. 264-25.000.

Watanabe, Tomoyuki: *See—*
Tokoro, Setsuo; Shigematsu, Takashi; and Watanabe, Tomoyuki, 4,673,378, Cl. 474-18.000.

Watanabe, Yasuo: *See—*
Sadaki, Hiroshi; Narita, Hirokazu; Imaizumi, Hiroyuki; Konishi, Yoshinori; Inaba, Takihiro; Hirakawa, Tatsuo; Taki, Hideo; Tai, Masaru; Watanabe, Yasuo; and Saikawa, Isamu, 4,673,738, Cl. 540-222.000.

Watarai, Hisao: *See—*
Uchikawa, Fusaoki; Takeuchi, Morihisa; Shimamoto, Kozo; Miyao, Kunihiko; Momiyama, Kimio; and Watarai, Hisao, 4,673,910, Cl. 338-35.000.

Watson, Roger J.: *See—*
George, Henry J.; Krzyzek, Richard A.; Enquist, Lynn W.; and Watson, Roger J., 4,673,641, Cl. 435-68.000.

Weatherby, John H., to Warner Electric Brake & Clutch Company. Centrifugal spring clutch. 4,673,073, Cl. 192-35.000.

Weaver, Douglas L., to Container Corporation of America. Dispensing container. 4,673,125, Cl. 229-17.00B.

Webb, Daniel D., to Peninsula Plastics Co., Inc. Collapsable, reusable container system. 4,673,087, Cl. 206-600.000.

Webb, Stephen F.; and Merrick, Brian J., to British Gas Corporation. Sealing of a pipe-joint. 4,673,449, Cl. 156-94.000.

Weber, Jurgen: *See—*
Wissmann, Michael; Nickel, Hans; and Weber, Jurgen, 4,672,929, Cl. 123-179.00G.

Weirick, Richard A., to Donnelly Corporation. Power control for heated windshields. 4,673,797, Cl. 219-203.000.

Weisman, Paul T.; Houghton, Dawn I.; and Gellert, Dale A., to Procter & Gamble Company, The. Absorbent articles with dual-layered cores. 4,673,402, Cl. 604-368.000.

Welch, Albert B., to Bio-Electric, Inc. Method and apparatus for treatment of biological tissue. 4,672,951, Cl. 128-1.500.

Weld Mold Company: *See—*
Kiilunen, Matt, 4,673,796, Cl. 219-145.220.

Welk, John R.: *See—*
Bujalski, Joseph; and Welk, John R., 4,673,930, Cl. 340-703.000.

Weller, John E.: *See—*
Smith, Gaylord D.; Brown, Douglas S.; Bernstein, Philip; and Weller, John E., 4,673,754, Cl. 556-137.000.

Wells, Gordon T. Footing form. 4,673,157, Cl. 249-13.000.

Wells, James R.; Portfolio, Donald C.; and Beck, Richard B., to Owens-Corning Fiberglas Corporation. Roof insulation board and method of making. 4,673,614, Cl. 428-285.000.

Wells, John R.; and Quirante, Carmelo G., to Miles Laboratories, Inc. Bottle top filter. 4,673,501, Cl. 210-406.000.

Wells, Robert A. Reclosable self-opening can end. 4,673,099, Cl. 220-269.000.

Werkzeugmaschinenfabrik Oerlikon-Buhrle AG: *See—*
Konersmann, Erhard, 4,672,850, Cl. 73-593.000.

Werkzeugmaschinenfabrik Oerlikon-Burhle: *See—*
Bohler, Erwin, 4,672,880, Cl. 89-12.000.

West, John; Golemme, Attilio; and Doane, Joseph W. Method of controlling microdroplet growth in polymeric dispersed liquid crystal. 4,673,255, Cl. 350-347.00V.

Westermeier, Heinz, to Siemens Aktiengesellschaft. Method for producing laser diodes with an adjusted and integrated heat sink. 4,672,736, Cl. 29-569.00L.

Westermeier, Heinz: *See—*
Heinen, Jochen; Kappeler, Franz; and Westermeier, Heinz, 4,674,095, Cl. 372-50.000.

Westinghouse Electric Corp.: *See—*
Edwards, Charles W., 4,674,025, Cl. 363-71.000.
Engel, Joseph C., 4,674,035, Cl. 364-200.000.
Li, Hung J.; and McFall, John D., 4,674,002, Cl. 361-66.000.
McDermott, Daniel J., 4,673,008, Cl. 141-198.000.
Paice, Derek A.; and Edwards, Charles W., 4,674,024, Cl. 363-71.000.
Rieben, Stuart L.; and Wylie, Mark E., 4,672,791, Cl. 53-327.000.
Shero, David J.; Dadpey, Habib; and Magee, C. Scott, 4,673,859, Cl. 318-810.000.
Silvestri, George J., Jr., 4,673,426, Cl. 55-457.000.
Zafred, Paolo R.; Veronesi, Luciano; and Maurer, Robert J., 4,672,741, Cl. 29-726.000.

Westover, Brooke N.; Lupoli, Peter J.; and Comerford, John J., to Casco Products Corporation. One-piece wrap-around clamping shell for cigar lighter. 4,673,238, Cl. 439-890.000.

Weyerhaeuser Company: *See—*
Marrs, Gevan R.; and Prieve, Kathryn A., 4,672,856, Cl. 73-863.520.

Wheeler, David C.: *See—*
Wheeler, Ernest E.; Wheeler, David C.; and Wheeler, William M., 4,673,268, Cl. 352-243.000.

Wheeler, Ernest E.; Wheeler, David C.; and Wheeler, William M. Pan and tilt mount. 4,673,268, Cl. 352-243.000.

Wheeler, Michael J.; and Hart, Curtis W. Automatically scaled engine diagnostic apparatus. 4,673,883, Cl. 324-384.000.

Wheeler, William M.: *See—*
Wheeler, Ernest E.; Wheeler, David C.; and Wheeler, William M., 4,673,268, Cl. 352-243.000.

Whitaker, Thomas S.: *See—*
Goudy, Paul R., Jr.; Cassedy, Linn W.; and Whitaker, Thomas S., 4,673,527, Cl. 252-181.000.

White, Edward A. Method for preparation of defluorinated phosphate. 4,673,555, Cl. 423-167.000.

White, Gerald W., to Cosden Technology, Inc. Method for making plastic containers having decreased gas permeability. 4,673,586, Cl. 427-38.000.

White, James W. Magnetic head air bearing slider assembly utilizing transverse pressurization contours. 4,673,996, Cl. 360-103.000.

White, Nicholas D.: *See—*
Potter, William D.; Kiamil, Sinan B.; and White, Nicholas D., 4,672,956, Cl. 128-90.000.

Whiteman, Gary D. Boiling alarm. 4,673,925, Cl. 340-603.000.

Whiteman, Jr. Marvin E. Concrete finishing machine having counterbalanced blade pitch adjustment apparatus. 4,673,311, Cl. 404-112.000.

Wiechert, Rudolf: *See—*
Laurent, Henry; and Wiechert, Rudolf, 4,673,673, Cl. 514-178.000.

Wiemer, Douglas, to Sundstrand Corporation. Variable speed integrator. 4,673,031, Cl. 165-39.000.

Wiesner, Jerome B.: *See—*
Lippman, Andrew B.; Bove, Victor M., Jr.; and Wiesner, Jerome B., 4,673,981, Cl. 358-160.000.

Wigner, Lauren R.; and Pandak, Zoltan I., to General Motors Corporation. Method of making a foamed seat or cushion having integral fasteners. 4,673,542, Cl. 264-46.700.

Wilcox, Anne S.; and Cooley, Gloria L., to Sungene Technologies Corporation. Sunflower regeneration through organogenesis. 4,673,648, Cl. 435-240.000.

Wilhelmson, Jack L.; and Postlewait, Lester B., to Cooper Industries, Inc. Calibrated probe for temperature measuring. 4,673,300, Cl. 374-182.000.

Wilkens, Arnold J. Sportsman's tool handle. 4,672,745, Cl. 30-340.000.

Wilkens, Jochen, to Hag GF Aktiengesellschaft. Process for separating caffeine from caffeine-loaded active carbon. 4,673,743, Cl. 544-275.000.

Wilkinson, Herbert C.; and Edsall, Jesse A. Lock tab wrench. 4,672,836, Cl. 72-479.000.

Will, Alan L. Rear disk brake conversion kit. 4,673,064, Cl. 188-18.00A.

Wm. Wrigley Jr. Company: *See*—
Patel, Mansukh M., 4,673,577, Cl. 426-5.000.

Williams, Harold L. Mirror wiper assembly with manually operated remote control. 4,672,708, Cl. 15-250.00B.

Willis, David P. Door locking device. 4,673,202, Cl. 292-162.000.

Wilson, Austin F.: *See*—
Bullock, Donald F.; and Wilson, Austin F., 4,673,873, Cl. 324-137.000.

Wilson, Gary A.: *See*—
Grosch, Josephine; Wilson, Gary A.; Wollweber, Karen; and Yehle, Clifford O., 4,673,638, Cl. 435-34.000.

Windischmann, Henry, to Standard Oil Company, The. Dual ion beam deposition of dense films. 4,673,475, Cl. 204-192.110.

Winkel, Jens: *See*—
Meier, Helmut-Martin; Dhein, Rolf; Winkel, Jens; Klein, Gerhard; and Kloker, Werner, 4,673,713, Cl. 525-278.000.

Winkler, William M.: *See*—
Small, Leonard E.; Garrison, Paul H., Jr.; Winkler, William M.; Seaman, Sharon A.; and Papa, Alyce J., 4,673,525, Cl. 252-132.000.

Winston, John H., to Outboard Marine Corporation. Multipart lost foam pattern and method of making same. 4,673,023, Cl. 164-246.000.

Winter, Jeremy N.: *See*—
Feast, William J.; and Winter, Jeremy N., 4,673,731, Cl. 528-503.000.

Wissmann, Michael; Nickel, Hans; and Weber, Jurgen, to Andreas Stihl. Automatic starting arrangement for an internal combustion engine. 4,672,929, Cl. 123-179.00G.

Withers, Christopher J.; and Pattle, David W., to Foseco International Limited. Using a rotary device for treating molten metal. 4,673,434, Cl. 75-61.000.

Wittwer, Fritz; and Tomka, Ivan, to Warner-Lambert Company. Polymer composition for injection molding. 4,673,438, Cl. 106-126.000.

Wolff, Siegfried: *See*—
Schwarze, Werner; Wolff, Siegfried; Remmel, Hans; and Lambertz, Horst, 4,673,741, Cl. 544-209.000.

Wolleben, Wolfgang: *See*—
Puhler, Alfred; Wolleben, Wolfgang; and Leineweber, Michael, 4,673,642, Cl. 435-91.000.

Wollweber, Karen: *See*—
Grosch, Josephine; Wilson, Gary A.; Wollweber, Karen; and Yehle, Clifford O., 4,673,638, Cl. 435-34.000.

Wolpers, Jurgen: *See*—
Nordsiek, Karl-Heinz; Wolpers, Jurgen; and Tornau, Johannes, 4,673,709, Cl. 525-99.000.

Wong, Bernard K.: *See*—
Crombie, Terence G.; and Wong, Bernard K., 4,672,888, Cl. 98-29.000.

Wong, Did-Bun; and Lubenow, Josef K., to R. R. Donnelley & Sons Company. Collating and binding system and method with postage indication. 4,674,052, Cl. 364-466.000.

Wong, James, to Supercon, Inc. Tantalum capacitor lead wire. 4,674,009, Cl. 361-433.000.

Wong, John M., to Envirodyne, Inc. Wastewater treatment bacterial additive. 4,673,505, Cl. 210-611.000.

Woo, Edmund P.: *See*—
Bertram, James L.; and Woo, Edmund P., 4,673,764, Cl. 564-155.000.
Bertram, James L.; and Woo, Edmund P., 4,673,765, Cl. 564-155.000.

Wood, F. Dianne: *See*—
Babcock, Robert E.; Beaver, W. Hardey; and Wood, F. Dianne, 4,673,484, Cl. 208-435.000.

Wood, John W. M.; and Hack, Richard C., to Marley Tile AG. Lightweight concrete roof tiles. 4,673,659, Cl. 106-98.000.

Workum, Donald. Spray-discharge device for a deformable container. 4,673,110, Cl. 222-211.000.

Worsey, Paul N.: *See*—
Tyler, Lawson J.; and Worsey, Paul N., 4,674,047, Cl. 364-423.000.

Wreford-Howard, David, to American Television & Communications Corporation. Cable television system data verification apparatus. 4,673,976, Cl. 358-10.000.

Wrobel, Guenter, to Papst-Motoren GmbH & Co. KG. Enamelled wire connection for circuit boards. 4,673,834, Cl. 310-71.000.

Wurtman, Richard J.; and Maher, Timothy J., to Massachusetts Institute of Technology. Method and composition for enhancing the effect of indirect-acting sympathomimetic amines. 4,673,689, Cl. 514-561.000.

Wyffels, Marc: *See*—
Rosseel, Rik; Decock, Bernard; Wyffels, Marc; and Ampe, Frank, 4,673,004, Cl. 139-435.000.

Wylie, Mark E.: *See*—
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Xerox Corporation: *See*—
Brown, Ian G., 4,673,279, Cl. 355-3.0SH.
Crystal, Richard G., 4,673,305, Cl. 400-460.000.
Hecht, David L., 4,673,953, Cl. 346-108.000.
Looschen, Floyd W., 4,673,811, Cl. 250-235.000.
Milton, Derek J., 4,673,280, Cl. 355-3.0CH.
Schenk, Richard C., 4,673,176, Cl. 271-186.000.
Shinbrot, Troy, 4,673,286, Cl. 355-25.000.
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Yagi, Nobuyuki: *See*—
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Yam, David S.: *See*—
Lindbloom, Bruce J.; Mathews, Peter; and Yam, David S., 4,674,058, Cl. 364-518.000.

Yamada, Hideo; Ichiki, Shigemi; Naniwa, Hisamoto; Uchida, Susumu; Kadokura, Kenji; Tsunoda, Susumu; and Nakajima, Kunio, to Nippon Yusen Kaisha; and Nihon Matai Co., Ltd. Liner bag for use in containers. 4,674,127, Cl. 383-6.000.

Yamada, Hiromichi: *See*—
Okamura, Masayoshi; Matsuda, Kiyoshi; Yamada, Hiromichi; Umeda, Hiromi; and Tomimoto, Masami, 4,673,655, Cl. 436-75.000.

Yamada, Katsunori: *See*—
Ikuta, Kunio; and Yamada, Katsunori, 4,673,971, Cl. 358-75.000.

Yamada, Keiichi: *See*—
Kushida, Takeo; and Yamada, Keiichi, 4,673,163, Cl. 251-129.100.

Yamada, Masanori, to Canon Kabushiki Kaisha. Electronic flash apparatus. 4,673,845, Cl. 315-241.00P.

Yamada, Mitsuhiko; and Kitamura, Hideaki, to Dainippon Screen Mfg. Co., Ltd. Method and apparatus for recording plural images with desired layout by an image reproducing scanner. 4,673,989, Cl. 358-287.000.

Yamagata, Tetsuo, to Honda Giken Kogyo Kabushiki Kaisha. Ignition system. 4,672,941, Cl. 123-602.000.

Yamaguchi, Koichi: *See*—
Fujiki, Hironao; Yamaguchi, Koichi; and Yamamoto, Yasushi, 4,673,621, Cl. 428-420.000.

Yamaguchi, Masayoshi; Meguro, Kazunori; Matsuo, Shuitsu; and Sasaki, Yasumi, to Toshiba Ceramics Co., Ltd. Alumina composite body and method for its manufacture. 4,673,435, Cl. 75-235.000.

Yamaguchi, Noboru: *See*—
Funabashi, Tsuneo; Iwasaki, Kazuhiko; Yamaguchi, Noboru; Shimura, Takanori; and Tatezaki, Junichi, 4,674,037, Cl. 364-200.000.

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Yamamoto, Hisashi; and Konaka, Yukio, to Shibuya Kogyo Co., Ltd. Cartoning machine having auxiliary flap sealer. 4,673,381, Cl. 493-128.000.

Yamamoto, Hitoshi: *See*—
Miyata, Takahide; Iwashita, Kanau; Taniuchi, Kazuman; Yamamoto, Hitoshi; and Nakamichi, Katsuhiro, 4,672,925, Cl. 123-65.0PE.

Yamamoto, Norio: *See*—
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Yamamoto, Tomohiro: *See*—
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Yamamoto, Yasushi: *See*—
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Watanabe, Takahiko; Sugano, Toshiyuki; Yamamoto, Yasushi; and Murayama, Kunihiko, 4,673,541, Cl. 264-25.000.

Yamanishi, Kazuhiko; Shintani, Akinori; Okajima, Satoru; and Hanada, Toshiro, to Wako Pure Chemical Industries Ltd. Triphenyl methane derivatives and method of quantitatively measuring an oxidative substance. 4,673,635, Cl. 435-10.000.

Yamanouchi Pharmaceutical Co., Ltd.: *See*—
Kawata, Hiroitsu; Aruga, Masayoshi; Ohmura, Tadayoshi; Sonobe, Takashi; Yoneya, Satoru; and Sone, Chiharu, 4,673,564, Cl. 424-494.000.

Yamanouchi, Shosuke: *See*—
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Yamaoka, Kojiro; and Okada, Hideaki, to Kanzaki Kokyukoki Mfg. Co., Ltd. Transmission for self-propelled working vehicles. 4,673,055, Cl. 180-336.000.

Yamasaki, Masakuni: *See*—
Tsukamoto, Hidehiko; Kohmoto, Eiji; Asada, Koichi, deceased; Yamasaki, Masakuni; Matsumoto, Kenichi; Nakazono, Euji; Wakamiya, Yoshinori; and Kuramoto, Satoru, 4,672,830, Cl. 72-8.000.

Yamashita, Hiroshi; Fujii, Kanenaga; Hayakawa, Junji; Komiyama, Toru; and Tamaru, Sinji, to Director-General of Agency of Industrial Science & Technology; and Diakin Kogyo Co., Ltd. Branch structures for rod-type optical transmission lines. 4,673,243, Cl. 350-96.150.

Yamato Denki Co., Ltd.: *See*—
Kubota, Teruo; and Tasaki, Takashi, 4,673,232, Cl. 439-441.000.

Yamawaki, Seiichi; Obuchi, Tomoki; Toyama, Noboru; and Shogen, Kazuyoshi, to NEC Corporation. Corrugated elliptical waveguide or horn. 4,673,905, Cl. 333-239.000.
Yamazaki, Hiroshi: *See*—
Ameyama, Minoru; Isayama, Takuro; Yamazaki, Hiroshi; Matsumoto, Shuzo; Katano, Yasuo; and Iwasaki, Kyuhachiro, 4,673,955, Cl. 346-140.00R.
Yamazaki, Toshinori; Nakanishi, Tatsuo; Marukawa, Yuji; Takenouchi, Shigeki; and Nomori, Hiroyuki, to Konishiroku Photo Industry Co., Ltd. Photoreceptor having amorphous silicon layers. 4,673,629, Cl. 430-58.000.
Yamazawa, Yasushi; Kondo, Katsumi; Tsutiya, Yasuhiro; Niimi, Takatsune; Yamamoto, Takashi; and Matsuba, Kunihiro, to Toyota Jidosha Kabushiki Kaisha. Method for manufacture of fiber reinforced resin structure such as a steering wheel core member. 4,673,451, Cl. 156-172.000.
Yanagase, Akira: *See*—
Murashige, Yoshio; Yanagase, Akira; Kawachi, Yasunori; and Soga, Junko, 4,673,688, Cl. 514-554.000.
Yanagisawa, Yoshikazu: *See*—
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Yannella, Albert V.: *See*—
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Yariv, Amnon: *See*—
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Yarumov, Kiril D.: *See*—
Todorov, Dimiter T.; Djudjev, Slavtcho G.; and Yarumov, Kiril D., 4,672,854, Cl. 73-861.330.
Yasukawa, Akio; and Misuna, Yoshihiro, to Katsura Roller Mfg. Co., Ltd. Antistatic cover. 4,672,825, Cl. 66-194.000.
Yasunaga, Tadashi: *See*—
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Yasuno, Hiroshi: *See*—
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Yeates, John N., to Du Pont Canada Inc. Separation of polymer from hydrocarbon solvent in the manufacture of polymers of ethylene. 4,673,768, Cl. 585-519.000.
Yeda Research & Development Co., Ltd.: *See*—
Steinberg, Itzchak Z., 4,673,260, Cl. 350-516.000.
Yeh, An-I: *See*—
Berg, Lloyd; and Yeh, An-I, 4,673,465, Cl. 203-51.000.
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Grosch, Josephine; Wilson, Gary A.; Wollweber, Karen; and Yehle, Clifford O., 4,673,638, Cl. 435-34.000.
Yokohama Rubber Co., Ltd., The: *See*—
Hara, Yoshiaki; and Wakabayashi, Masashi, 4,673,314, Cl. 405-215.000.
Yokoi, Tatsuhisa; Takeya, Eisaku; Hattori, Kyo; Abe, Kazuo; and Osawa, Hideyuki, to Toyota Jidosha Kabushiki Kaisha; and Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Intake manifold for internal combustion engine having exhaust gas recirculation system. 4,672,939, Cl. 123-568.000.
Yokomizo, Yoshikazu, to Canon Kabushiki Kaisha. Color image processing apparatus in which different color signals of different colors are read into different memories at different rates. 4,673,972, Cl. 358-77.000.
Yokoyama, Hiroshi, to NEC Corporation. Array antenna system. 4,673,942, Cl. 342-368.000.
Yokoyama, Shoh, to Tachikawa Spring Co., Ltd. Seat frame for automobile seats. 4,673,215, Cl. 297-452.000.
Yoneda, Aritoshi, to Horiba, Ltd. Calibrating mechanism of an infrared analyzer. 4,673,812, Cl. 250-252.100.
Yoneya, Satoru: *See*—
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Yoshida, Daisuke; Tanno, Tomiya; and Fukunaga, Takeshi, to Kabushiki Kaisha Komatsu Seisakubsho. Vehicle speed control system. 4,672,811, Cl. 60-449.000.
Yoshida, Hideki; Shinohara, Koichi; and Suzuki, Takashi, to Matsushita Electric Industrial Co., Ltd. Thin film magnetic recording media. 4,673,617, Cl. 428-323.000.
Yoshida, Kenji, to Mitsubishi Denki Kabushiki Kaisha. Elevator remote-control apparatus. 4,673,911, Cl. 187-100.000.
Yoshida Kogyo K. K.: *See*—
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Yoshida, Shozo; and Ohmura, Hiroshi, to Canon Kabushiki Kaisha. Blur detecting device for a camera. 4,673,276, Cl. 354-430.000.
Yoshida, Susumu: *See*—
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Hagiwara, Isao; and Yoshida, Yukio, 4,673,848, Cl. 318-266.000.
Yoshifuji, Yutaka: *See*—
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Yoshikawa, Naoki: *See*—
Takagi, Yoshito; Wakahara, Yasuyuki; Hamano, Satoru; Mori, Masanori; Hamaguchi, Masayuki; and Yoshikawa, Naoki, 4,673,838, Cl. 310-239.000.
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, to Kureha Kagaku Kogyo Kabushiki Kaisha. Pharmaceutical composition containing a derivative of para-aminobenzoic acid as an active ingredient. 4,673,669, Cl. 514-42.000.
Yoshimi, Yasuhito, to Dainippon Screen Mfg. Co., Ltd. Processing apparatus for photosensitive material. 4,673,273, Cl. 354-322.000.
Yoshimoto, Masakazu: *See*—
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Yoshimoto, Shin-ichi; Ando, Reigo; Shirai, Takeshi; and Nomura, Hiroshi, to Nippon Columbia Co. Ltd. Disc reproducing apparatus with carousel using disc clamping device. 4,674,077, Cl. 369-37.000.
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Itaba, Yasushi; Yoshino, Tadao; Yoshifuji, Yutaka; Saito, Keichiro; and Tabuchi, Jyoichi, 4,673,619, Cl. 428-338.000.
Yoshizawa, Kenji; Komura, Hirotsugu; Kodama, Hitoshi; Ohnuki, Kazushi; Shoda, Isao; Magome, Kazuo; and Ito, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Microwave discharge light source apparatus. 4,673,846, Cl. 315-248.000.
Young, Donald C., to Union Oil Company of California. Methods for removing obstructions from conduits with urea-sulfuric acid compositions. 4,673,522, Cl. 252-87.000.
Young, Edgar W.: *See*—
Frain, William J., III; Hazelton, Donald R.; and Young, Edgar W., 4,673,604, Cl. 428-95.000.
Young, Philip J.: *See*—
Riley, Eric K.; Dudill, Roger; and Young, Philip J., 4,673,348, Cl. 431-115.000.
Young, Ronald: *See*—
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Young, Thomas M.: *See*—
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Young, William S.: *See*—
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Yukawa, Toshihide: *See*—
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Yumlu, Salih V., to Mack Trucks, Inc. Split flow particulate filter. 4,673,423, Cl. 55-319.000.
Zabotto, Arlette; and Contamin, Jean-Claude, to Societe Anonyme dite: L'Oreal. Anhydrous skin cleansing composition containing an oil phase, an emulsifing agent and particulate water soluble polymeric abrasive particles. 4,673,526, Cl. 252-174.160.
Zafred, Paolo R.; Veronesi, Luciano; and Maurer, Robert J., to Westinghouse Electric Corp. End effector apparatus for positioning a steam generator heat exchanger tube plugging tool. 4,672,741, Cl. 29-726.000.
Zboralski, James A.: *See*—
Kaleita, David L.; Zboralski, James A.; and Hock, Darryl A., 4,674,115, Cl. 379-201.000.
Zebula, Charles: *See*—
Datta, Rabinder S.; Aplan, Frank F.; and Zebula, Charles, 4,673,133, Cl. 241-19.000.
Zeilenga, Christopher. Protective mechanism for circular saws. 4,672,746, Cl. 30-391.000.
Zeiset, A. Leon. Automatic ladder leveling apparatus. 4,673,061, Cl. 182-202.000.
Zeitsch, Karl J., to Fried. Krupp Gesellschaft mit beschrankter Haftung. Distillation and absorption column trays. 4,673,464, Cl. 202-158.000.
Zellweger Uster Ltd.: *See*—
Goede, Simon, 4,673,003, Cl. 139-342.000.
Zemanek, Joseph, Jr., to Mobil Oil Corporation. Method and apparatus for generating low frequency acoustic energy waves. 4,674,067, Cl. 367-25.000.
Zenith Electronics Corporation: *See*—
Adler, Robert; and Jarosz, John M., 4,673,918, Cl. 340-365.00P.
Petrow, William M., 4,673,906, Cl. 335-210.000.
Zerle, Ludwig; Brunner, Gerhard; and Lorenz, Otto. Method of detecting and evaluating identification codes on continuously moving webs. 4,673,803, Cl. 235-436.000.
Zero Engineering Ltd.: *See*—
Takahashi, Akira; and Hasegawa, Isao, 4,674,001, Cl. 360-137.000.
Zhigalov, Gennady V.: *See*—
Abduganiev, Aburakhim; Zhigalov, Gennady V.; and Batalkina, Tatyana M., 4,672,801, Cl. 57-86.000.
Ziegler, William E. Multiple station, multiple clamp assembly blow molding machines. 4,673,347, Cl. 425-538.000.

Zillmer, Roger C.: *See*—
Sandiford, Burton B.; and Zillmer, Roger C., 4,673,038, Cl. 166-270.000.
Zink, Leonard: *See*—
Braverman, Milton; and Zink, Leonard, 4,673,086, Cl. 206-538.000.
Zschocke, Christian, to Akademie der Deutschen Demokratischen Republik. Fluid-operated transporting crawler-type track. 4,673,050, Cl. 180-9.100.
zur Nieden, Achim: *See*—
Wahnschaffe, Jurgen; Hartmann, Ernst-Siegfried; Casper, Karl-Josef; zur Nieden, Achim; and Schleiermacher, Herbert, 4,672,923, Cl. 123-41.740.
Zylka, Hans-Joachim, to J. Wagner AG. Electronic high-voltage generator for electrostatic sprayer devices. 4,674,003, Cl. 361-235.000.
2500 Corporation, The: *See*—
Roth, David W., 4,673,603, Cl. 428-85.000.
501 NGK Spark Plug Co. Ltd.: *See*—
Taniguchi, Masato; Nishio, Hisaharu; Kawamura, Mitsuyoshi; and Okumura, Toshio, 4,672,933, Cl. 123-270.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 16TH DAY OF JUNE, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Completion Tool Company: *See*—
Wood, Edward T.; and Snyder, Robert E., Re. 32,438, Cl. 277-34.000.

Hashimoto, Takahumi: *See*—
Innami, Yoshiyuki; and Hashimoto, Takahumi, Re. 32,440, Cl. 200-144.00B.

Innami, Yoshiyuki; and Hashimoto, Takahumi, to Kabushiki Kaisha Meidensha. Vacuum circuit interrupter. Re. 32,440, Cl. 200-144.00B.

Kabushiki Kaisha Meidensha: *See*—
Innami, Yoshiyuki; and Hashimoto, Takahumi, Re. 32,440, Cl. 200-144.00B.

Narozny, Ronald S., to Thomas & Betts Corporation. Three-row connector for mass terminating flat cable. Re. 32,439, Cl. 439-404.000.

Snyder, Robert E.: *See*—
Wood, Edward T.; and Snyder, Robert E., Re. 32,438, Cl. 277-34.000.

Thomas & Betts Corporation: *See*—
Narozny, Ronald S., Re. 32,439, Cl. 439-404.000.

Wood, Edward T.; and Snyder, Robert E., to Completion Tool Company. Well packer valve arrangement. Re. 32,438, Cl. 277-34.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Watson, John V., to Watson Manufacturing Company. Universally mounted drilling mast. B1 3,500,938, 6-16-87, Cl. 173-40.000.

Watson Manufacturing Company: *See*—
Watson, John V., B1 3,500,938, Cl. 173-40.000.

LIST OF DESIGN PATENTEES

Abe, Takehiko, to Hinoki Shinyaku Co., Ltd. Carton. 290,345, 6-16-87, Cl. D9-431.000.

Advanced Products Incorporated: *See*—
McCaffrey, James A., 290,340, Cl. D8-358.000.

Allibert SA: *See*—
Deconinck, Didier, 290,319, Cl. D6-488.000.

Alternate Resources Limited: *See*—
Starkey, Peter, 290,397, Cl. D24-17.000.

American Home Products Corporation: *See*—
Siegel, Howard P., 290,346, Cl. D9-438.000.

Amerock Corporation: *See*—
Tegner, Raymond U. H., 290,338, Cl. D8-350.000.

Anderson, Rickie W. Vehicle top sign carrier. 290,378, 6-16-87, Cl. D20-10.000.

Anzelone, Thomas A.; Cotton, Raymond F.; Davis, Myron F.; del Sol, Pedro D.; Ewart, Robert M., Jr.; Goetz, Fred E.; and Lewis, Paul B., to International Business Machines Corporation. Keyboard for a personal computer. 290,360, 6-16-87, Cl. D14-100.000.

Aono, Tetsuya, to Maruzen Sewing Machine Co., Ltd. Sewing machine. 290,367, 6-16-87, Cl. D15-69.000.

Bardue, Casey M.: *See*—
Jones, Paul W.; and Bardue, Casey M., 290,396, Cl. D24-17.000.

Bellini, Mario, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic keyboard musical instrument. 290,370, 6-16-87, Cl. D17-1.000.

Bergh, Trach; and Cooney, Joseph J. Game board. 290,379, 6-16-87, Cl. D21-33.000.

Berglof, Carl-Olof B.; and Sorum, Erik, to Saab-Scania Aktiebolag. Swing door for a glove compartment of an automobile. 290,350, 6-16-87, Cl. D12-155.000.

Berry, Richard D., Jr., to Design Institute America, Inc. Table. 290,318, 6-16-87, Cl. D6-486.000.

Bianchi International, Inc.: *See*—
Metzger, Donald B., 290,311, Cl. D3-101.000.

Bjorkman, Rune, to Pharmacia AB. Module holder for test tubes. 290,401, 6-16-87, Cl. D24-32.000.

Brandsma, Sies K.; and Schouten, Henderikus P., to U.S. Philips Corporation. Clock radio receiver. 290,358, 6-16-87, Cl. D14-73.000.

Breuer, Thomas A., to Croslink Plastics, Inc. Pick-up unit for animal droppings. 290,416, 6-16-87, Cl. D30-99.000.

Briggs, Richard. Picture mat with notch for artist's signature. 290,313, 6-16-87, Cl. D6-300.000.

Brown, Kenneth A., to Second Chance Systems, Inc. Combined emergency flashlight and smoke alarm system. 290,406, 6-16-87, Cl. D26-38.000.

Brundage, Richard B.: *See*—
Eccardt, Curtis J.; and Brundage, Richard B., 290,369, Cl. D15-133.000.

Bulto, Salvador B., to Moulinex, Societe Anonyme. Juice extractor. 290,329, 6-16-87, Cl. D7-49.000.

Bunn-O-Matic Corporation: *See*—
Foley, Henry L.; and Van Camp, Raymond E., 290,332, Cl. D7-373.000.

Caddick, Mary J. Pollution control vessel. 290,351, 6-16-87, Cl. D12-300.000.

Cain, Ann S., to 'totes', incorporated. Umbrella handle. 290,307, 6-16-87, Cl. D3-12.000.

Caine, Harold A. Lens for a vehicle light. 290,411, 6-16-87, Cl. D26-120.000.

Campbell, Walter A. Leg warmer. 290,302, 6-16-87, Cl. D2-267.000.

Carlson, Arthur R. Carrier for a wine cask bladder and spigot. 290,308, 6-16-87, Cl. D3-30.100.

Cautereels, Victor J. J.: *See*—
Daenen, Robert H. C. M.; and Cautereels, Victor J. J., 290,326, Cl. D7-17.000.

Chiasson, Gail L. Portable support stand for a typewriter. 290,316, 6-16-87, Cl. D6-406.000.

Chicago Cutlery Consumer Products, Inc.: *See*—
Pashley, Robert, 290,333, Cl. D8-99.000.

Cibic, Aldo. Door handle. 290,335, 6-16-87, Cl. D8-308.000.

Citizen Watch Co., Ltd.: *See*—
Komatsu, Jun, 290,347, Cl. D10-38.000.

Commonwealth of Australia, The: *See*—
Toms, Maxwell H., 290,344, Cl. D9-424.000.

Conway, Ronald I.; and Lucente, Samuel A., to International Business Machines Corporation. Computer display or the like. 290,363, 6-16-87, Cl. D14-113.000.

Cooney, Joseph J.: *See*—
Bergh, Trach; and Cooney, Joseph J., 290,379, Cl. D21-33.000.

Cornette, Clint G. Leg elevating support for a sunbather. 290,320, 6-16-87, Cl. D6-491.000.

Coscione, Joseph D.; French, John T.; and Harris, Willard P., to Fireplace Manufacturers, Inc. Glass fireplace door. 290,392, 6-16-87, Cl. D23-138.300.

Cotton, Raymond F.: *See—*
Anzelone, Thomas A.; Cotton, Raymond F.; Davis, Myron F.; del Sol, Pedro D.; Ewart, Robert M., Jr.; Goetz, Fred E.; and Lewis, Paul B., 290,360, Cl. D14-100.000.
Crosslink Plastics, Inc.: *See—*
Breuer, Thomas A., 290,416, Cl. D30-99.000.
Cuno Incorporated: *See—*
Padilla, James M., 290,386, Cl. D23-3.000.
Daar, Yair; and Yahav, Shimon. Depilator. 290,398, 6-16-87, Cl. D24-26.000.
Daenen, Robert H. C. M.; and Cautereels, Victor J. J., to Dart Industries Inc. Covered serving tray or the like. 290,326, 6-16-87, Cl. D7-17.000.
Dart Industries Inc.: *See—*
Daenen, Robert H. C. M.; and Cautereels, Victor J. J., 290,326, Cl. D7-17.000.
Davis, Myron F.: *See—*
Anzelone, Thomas A.; Cotton, Raymond F.; Davis, Myron F.; del Sol, Pedro D.; Ewart, Robert M., Jr.; Goetz, Fred E.; and Lewis, Paul B., 290,360, Cl. D14-100.000.
Deconinck, Didier, to Allibert SA. Table. 290,319, 6-16-87, Cl. D6-488.000.
del Sol, Pedro D.: *See—*
Anzelone, Thomas A.; Cotton, Raymond F.; Davis, Myron F.; del Sol, Pedro D.; Ewart, Robert M., Jr.; Goetz, Fred E.; and Lewis, Paul B., 290,360, Cl. D14-100.000.
Design Institute America, Inc.: *See—*
Berry, Richard D., Jr., 290,318, Cl. D6-486.000.
Diamond, Harvey E. Set of wells for bathtubs. 290,390, 6-16-87, Cl. D23-69.000.
Dionite Inc.: *See—*
Savage, Gary, 290,337, Cl. D8-316.000.
Downs, Stephen C., to USV Pharmaceutical Corp. Pharmaceutical tablet. 290,412, 6-16-87, Cl. D28-2.000.
Durand, Jean-Jacques. Salad bowl or similar article. 290,327, 6-16-87, Cl. D7-28.000.
Durand, Jean-Jacques. Perfume bottle or similar article. 290,341, 6-16-87, Cl. D9-384.000.
Eccardt, Curtis J.; and Brundage, Richard B., to Emerson Electric Co. Scroll saw. 290,369, 6-16-87, Cl. D15-133.000.
Eguchi, Yoshiaki, to Janome Sewing Machine Co., Ltd. Sewing machine. 290,368, 6-16-87, Cl. D15-69.000.
Emerson Electric Co.: *See—*
Eccardt, Curtis J.; and Brundage, Richard B., 290,369, Cl. D15-133.000.
Enduro Binders, Inc.: *See—*
Maune, Michael E., 290,376, Cl. D19-32.000.
Ewart, Robert M., Jr.: *See—*
Anzelone, Thomas A.; Cotton, Raymond F.; Davis, Myron F.; del Sol, Pedro D.; Ewart, Robert M., Jr.; Goetz, Fred E.; and Lewis, Paul B., 290,360, Cl. D14-100.000.
Fink, Jimmy. Glove. 290,304, 6-16-87, Cl. D2-617.000.
Fireplace Manufacturers, Inc.: *See—*
Coscione, Joseph D.; French, John T.; and Harris, Willard P., 290,392, Cl. D23-138.300.
Fisher, Kim J., to U.S. Philips Corporation. Digital pager. 290,356, 6-16-87, Cl. D14-68.000.
Foley, Henry L.; and Van Camp, Raymond E., to Bunn-O-Matic Corporation. Coffee grinder. 290,332, 6-16-87, Cl. D7-373.000.
Foster Industries Company Limited: *See—*
Leung, Chung S., 290,417, Cl. D32-18.000.
Frees, David; and Schwartz, Edwin L. Timing light. 290,348, 6-16-87, Cl. D10-112.000.
French, John T.: *See—*
Coscione, Joseph D.; French, John T.; and Harris, Willard P., 290,392, Cl. D23-138.300.
Fuji Robin Kabushiki Kaisha: *See—*
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Gardco Manufacturing, Inc.: *See—*
Gendron, William T.; Rapp, William J.; Green, Frederic L.; Unoki, Katsuhiro; and Gaskins, Robert J., 290,408, Cl. D26-67.000.
Gendron, William T.; Rapp, William J.; Green, Frederic L.; Unoki, Katsuhiro; and Gaskins, Robert J., 290,409, Cl. D26-67.000.
Gaskins, Robert J.: *See—*
Gendron, William T.; Rapp, William J.; Green, Frederic L.; Unoki, Katsuhiro; and Gaskins, Robert J., 290,408, Cl. D26-67.000.
Gendron, William T.; Rapp, William J.; Green, Frederic L.; Unoki, Katsuhiro; and Gaskins, Robert J., 290,409, Cl. D26-67.000.
Gendron, William T.; Rapp, William J.; Green, Frederic L.; Unoki, Katsuhiro; and Gaskins, Robert J., to Gardco Manufacturing, Inc. Luminaire. 290,408, 6-16-87, Cl. D26-67.000.
Gendron, William T.; Rapp, William J.; Green, Frederic L.; Unoki, Katsuhiro; and Gaskins, Robert J., to Gardco Manufacturing, Inc. Luminaire. 290,409, 6-16-87, Cl. D26-67.000.
General Signal Corporation: *See—*
Stevens, Philip H.; and Merritt, Charles F. T., 290,393, Cl. D24-8.000.
Stevens, Philip H.; and Merritt, Charles F. T., 290,394, Cl. D24-8.000.
Stevens, Philip H.; and Merritt, Charles F. T., 290,395, Cl. D24-8.000.
Gerber, William C., to Rubbermaid Incorporated. Window bird feeder. 290,414, 6-16-87, Cl. D30-18.000.
Goetz, Fred E.: *See—*
Anzelone, Thomas A.; Cotton, Raymond F.; Davis, Myron F.; del Sol, Pedro D.; Ewart, Robert M., Jr.; Goetz, Fred E.; and Lewis, Paul B., 290,360, Cl. D14-100.000.
Green, Frederic L.: *See—*
Gendron, William T.; Rapp, William J.; Green, Frederic L.; Unoki, Katsuhiro; and Gaskins, Robert J., 290,408, Cl. D26-67.000.
Gendron, William T.; Rapp, William J.; Green, Frederic L.; Unoki, Katsuhiro; and Gaskins, Robert J., 290,409, Cl. D26-67.000.
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Haggard, Robert E., to Haggard, Merry. Illuminated street bollard or the like. 290,410, 6-16-87, Cl. D26-68.000.
Harris, Willard P.: *See—*
Coscione, Joseph D.; French, John T.; and Harris, Willard P., 290,392, Cl. D23-138.300.
Hatano, Hiroaki; and Mochizuki, Takeshi, to Fuji Robin Kabushiki Kaisha. Bush cutter. 290,365, 6-16-87, Cl. D15-10.000.
Hinoki Shinyaku Co., Ltd.: *See—*
Abe, Takehiko, 290,345, Cl. D9-431.000.
Hoepfner, Thomas L.; and Leistikow, Keith A. Combined grass collector and blower. 290,366, 6-16-87, Cl. D15-17.000.
Hostetler, Eldon, to Ziggity Systems, Inc. Cage mounted poultry watering unit. 290,413, 6-16-87, Cl. D30-14.000.
Hoyt, Dolph G., Jr., to Principle Plastics. Bell boot for horse's hoof. 290,415, 6-16-87, Cl. D30-34.000.
Ichikawa Press Industry Co., Ltd.: *See—*
Oxawa, Mitsuyoshi, 290,402, Cl. D24-40.000.
Ideal Aqua Miracle Inc.: *See—*
Lagace, Gaetan, 290,330, Cl. D7-306.000.
Iida, Katsuhiro: *See—*
Yubisui, Takahisa; Sakaguchi, Hiroshi; and Iida, Katsuhiro, 290,372, Cl. D18-7.000.
Imotani, Mitsuru. Straw with a bowl-like head. 290,328, 6-16-87, Cl. D7-42.000.
Inoue, Chuichi; Tsubaki, Hiroyuki; Kawata, Yoshiaki; and Uematsu, Toyoyuki, to Matsushita Electric Industrial Co., Ltd. Television receiver. 290,359, 6-16-87, Cl. D14-80.000.
International Business Machines Corporation: *See—*
Anzelone, Thomas A.; Cotton, Raymond F.; Davis, Myron F.; del Sol, Pedro D.; Ewart, Robert M., Jr.; Goetz, Fred E.; and Lewis, Paul B., 290,360, Cl. D14-100.000.
Conway, Ronald I.; and Lucente, Samuel A., 290,363, Cl. D14-113.000.
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Israel Aircraft Industries, Ltd.: *See—*
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Janome Sewing Machine Co., Ltd.: *See—*
Eguchi, Yoshiaki, 290,368, Cl. D15-69.000.
Joerger, Gerhard E. Bathroom faucet set. 290,387, 6-16-87, Cl. D23-25.000.
John Manufacturing Limited: *See—*
Yuen, John S., 290,407, Cl. D26-42.000.
Johns, David L., to Suncoast Medical Manufacturing, Inc. Extended illuminator. 290,405, 6-16-87, Cl. D26-37.000.
Jones, Paul W.; and Bardue, Casey M., to Physio-Control Corporation. Defibrillator paddle. 290,396, 6-16-87, Cl. D24-17.000.
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Reynolds, James E., Jr., 290,334, Cl. D8-105.000.
Kasai, Kazumi, to Nippon Notion Kogyo Co., Ltd. Belt adjuster. 290,349, 6-16-87, Cl. D11-218.000.
Kawano, Kazuhiko; and Tsunetsugu, Toru, to Pioneer Amafone Manufacturing Corporation. Combined telephone, automatic answering and recording machine. 290,353, 6-16-87, Cl. D14-52.000.
Kawata, Yoshiaki: *See—*
Inoue, Chuichi; Tsubaki, Hiroyuki; Kawata, Yoshiaki; and Uematsu, Toyoyuki, 290,359, Cl. D14-80.000.
Kitchens, David G., to Zimmer, Inc. Combined driver and extractor for intramedullary pins or the like. 290,399, 6-16-87, Cl. D24-26.000.
Klober GmbH & Co.: *See—*
Vogtherr, Burkhard, 290,321, Cl. D6-500.000.
Knickerbocker, Robert H., to Siemon Company, The. Combined eight conductor modular plug and test adapter. 290,352, 6-16-87, Cl. D13-28.000.
Ko, Hsi Chia. Faucet handle. 290,389, 6-16-87, Cl. D23-29.000.
Komatsu, Jun, to Citizen Watch Co., Ltd. Watch case. 290,347, 6-16-87, Cl. D10-38.000.
Kone Instruments Inc.: *See—*
Tong, Peter P., 290,400, Cl. D24-29.000.
Ladie and Friends, Inc.: *See—*
Wisber, Barbara K., 290,381, Cl. D21-154.000.
Lagace, Gaetan, to Ideal Aqua Miracle Inc. Distilled water dispenser. 290,330, 6-16-87, Cl. D7-306.000.
Leistikow, Keith A.: *See—*
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Leung, Chung S., to Foster Industries Company Limited. Vacuum cleaner. 290,417, 6-16-87, Cl. D32-18.000.
Levy, Marc H. T-shirt. 290,301, 6-16-87, Cl. D2-215.000.
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Anzelone, Thomas A.; Cotton, Raymond F.; Davis, Myron F.; del Sol, Pedro D.; Ewart, Robert M., Jr.; Goetz, Fred E.; and Lewis, Paul B., 290,360, Cl. D14-100.000.
Liebau, Ruth M. Tie rack. 290,314, 6-16-87, Cl. D6-320.000.
Lowery, Archie J. Wire rope socket. 290,339, 6-16-87, Cl. D8-354.000.

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Nagamatsu, Yasuo; Sakamoto, Masaharu; Moriyama, Toshiya; and Miyamoto, Isshin, 290,361, Cl. D14-111.000.
Maune, Michael E., to Enduro Binders, Inc. Identifying tab for book spine. 290,376, 6-16-87, Cl. D19-32.000.
McCaffrey, James A., to Advanced Products Incorporated. Spool assembly. 290,340, 6-16-87, Cl. D8-358.000.
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McNeil, Ronald A. Handle for a spin casting fishing rod. 290,384, 6-16-87, Cl. D22-142.000.
McNeil, Ronald A. Handle for a bait casting fishing rod. 290,385, 6-16-87, Cl. D22-142.000.
Mepal Service B.V.: *See—*
Weernink, Johannes H., 290,323, Cl. D7-6.000.
Merritt, Charles F. T.: *See—*
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Stevens, Philip H.; and Merritt, Charles F. T., 290,394, Cl. D24-8.000.
Stevens, Philip H.; and Merritt, Charles F. T., 290,395, Cl. D24-8.000.
Metzger, Donald B., to Bianchi International, Inc. Stiffening tip for a fastening strap for holsters. 290,311, 6-16-87, Cl. D3-101.000.
Miyamoto, Isshin: *See—*
Nagamatsu, Yasuo; Sakamoto, Masaharu; Moriyama, Toshiya; and Miyamoto, Isshin, 290,361, Cl. D14-111.000.
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Nagamatsu, Yasuo; Sakamoto, Masaharu; Moriyama, Toshiya; and Miyamoto, Isshin, to Matsushita Electric Industrial Co., Ltd. Printer. 290,361, 6-16-87, Cl. D14-111.000.
Nagele, Albert L., to Motorola, Inc. Keyboard stand for a telephone handset transceiver. 290,355, 6-16-87, Cl. D14-62.000.
Nakamura, Kazuharu, to Toyotomi Kogyo Co., Ltd. Electric radiant heater. 290,391, 6-16-87, Cl. D23-123.000.
Nava Milano S.p.A.: *See—*
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Osawa, Mitsuyoshi, to Ichikawa Press Industry Co., Ltd. Combined electric kneader and vibratory massager. 290,402, 6-16-87, Cl. D24-40.000.
Osborne, Edward L., to Westvaco Corporation. Packaging container. 290,343, 6-16-87, Cl. D9-418.000.
Padilla, James M., to Cuno Incorporated. Water purifier or similar article. 290,386, 6-16-87, Cl. D23-3.000.
Pashley, Robert, to Chicago Cutlery Consumer Products, Inc. Utility knife. 290,333, 6-16-87, Cl. D8-99.000.
Paul Associates: *See—*
Paul, Stanley M., 290,336, Cl. D8-308.000.
Paul, Stanley M., to Paul Associates. Door handle. 290,336, 6-16-87, Cl. D8-308.000.
Petruzzi, Barbara B. Swimsuit. 290,300, 6-16-87, Cl. D2-40.000.
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Jones, Paul W.; and Bardue, Casey M., 290,396, Cl. D24-17.000.
Pickens, Bobby S. Combined belt and tennis ball holder. 290,306, 6-16-87, Cl. D2-630.000.
Pioneer Ansafone Manufacturing Corporation: *See—*
Kawano, Kazuhiko; and Tsunetsugu, Toru, 290,353, Cl. D14-52.000.
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Lyons, Gerard E., 290,342, Cl. D9-405.000.
Pranica, Rebecca W., to Zwicker Knitting Mills. Glove or similar article. 290,305, 6-16-87, Cl. D2-621.000.
Price Pfister, Inc.: *See—*
Yost, Holly K., 290,388, Cl. D23-29.000.
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Rau, E. Christine. Stilt. 290,380, 6-16-87, Cl. D21-72.000.
Reynolds, James E., Jr., to JRJ Industries. Rescue tool. 290,334, 6-16-87, Cl. D8-105.000.
Ritman, Joost R. Cup. 290,324, 6-16-87, Cl. D7-9.000.
Ritman, Joost R. Cup. 290,325, 6-16-87, Cl. D7-9.000.
Rubbermaid Incorporated: *See—*
Gerber, William C., 290,414, Cl. D30-18.000.
Ryan, Desmond J., to Northern Telecom Limited. Telephone set add-on accessory module. 290,354, 6-16-87, Cl. D14-60.000.
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Satake, Noriko: *See—*
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Savage, Gary, to Dionite Inc. Suitcase handle. 290,337, 6-16-87, Cl. D8-316.000.
Sawit, Sanchez C. Housing for containing electronic circuitry for isotonic exercise device. 290,382, 6-16-87, Cl. D21-191.000.
Schouten, Henderikus P., to U.S. Philips Corporation. Clock radio receiver. 290,357, 6-16-87, Cl. D14-73.000.
Schouten, Henderikus P.: *See—*
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Sharp Corporation: *See—*
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Yubisui, Takahisa; and Sakaguchi, Hiroshi, 290,373, Cl. D18-7.000.
Yubisui, Takahisa; and Satake, Noriko, 290,374, Cl. D18-7.000.
Siegel, Howard P., to American Home Products Corporation. Cover for a container. 290,346, 6-16-87, Cl. D9-438.000.
Siemon Company, The: *See—*
Knickerbocker, Robert H., 290,352, Cl. D13-28.000.
Sink, John B. Catheter bag holder. 290,403, 6-16-87, Cl. D24-58.000.
Sjoqvist, Carl-Gustav. Hunting knife. 290,383, 6-16-87, Cl. D22-118.000.
Slayer, Peter D.; and Vining, Harrison F. S. Musical tuning device. 290,371, 6-16-87, Cl. D17-99.000.
Smith Cabinet Manufacturing Company, Inc.: *See—*
Suvak, William S.; and Snyder, Lloyd I., 290,322, Cl. D6-508.000.
Snyder, Lloyd I.: *See—*
Suvak, William S.; and Snyder, Lloyd I., 290,322, Cl. D6-508.000.
Sorum, Erik: *See—*
Berglof, Carl-Olof B.; and Sorum, Erik, 290,350, Cl. D12-155.000.
Starkey, Peter, to Alternate Resources Limited. Sliding scale device for medical diagnostic purposes. 290,397, 6-16-87, Cl. D24-17.000.
Stevens, Philip H.; and Merritt, Charles F. T., to General Signal Corporation. Lab mixer. 290,393, 6-16-87, Cl. D24-8.000.
Stevens, Philip H.; and Merritt, Charles F. T., to General Signal Corporation. Lab mixer with adjustable shaft. 290,394, 6-16-87, Cl. D24-8.000.
Stevens, Philip H.; and Merritt, Charles F. T., to General Signal Corporation. Lab mixer with adjustable shaft. 290,395, 6-16-87, Cl. D24-8.000.
Stoler, Arie, to Israel Aircraft Industries, Ltd. Support post for taut-wire fence. 290,404, 6-16-87, Cl. D25-77.000.
Strohmeyer, Rolf, to Vorwerk & Co. Elektrowerke KG. Carpet brush. 290,418, 6-16-87, Cl. D32-32.000.
Strohmeyer, Rolf, to Vorwerk & Co. Elektrowerke KG. Carpet brush. 290,419, 6-16-87, Cl. D32-32.000.
Suncoast Medical Manufacturing, Inc.: *See—*
Johns, David L., 290,405, Cl. D26-37.000.
Suvak, William S.; and Snyder, Lloyd I., to Smith Cabinet Manufacturing Company, Inc. Crib end. 290,322, 6-16-87, Cl. D6-508.000.
Swenson, Duain: *See—*
Swenson, Neil C.; and Swenson, Duain, 290,315, Cl. D6-337.000.
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Tabah, Victor V. Peanut butter machine. 290,331, 6-16-87, Cl. D7-372.000.
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Tegner, Raymond U. H., to Amerock Corporation. Escutcheon plate. 290,338, 6-16-87, Cl. D8-350.000.
Teledyne Industries, Inc.: *See—*
Wilkinson, Ronald E., 290,364, Cl. D15-5.000.
Toms, Maxwell H., to Commonwealth of Australia, The. Packaging container. 290,344, 6-16-87, Cl. D9-424.000.
Tong, Peter P., to Kone Instruments Inc. Reagent vessel. 290,400, 6-16-87, Cl. D24-29.000.
'totes', incorporated: *See—*
Cain, Ann S., 290,307, Cl. D3-12.000.

Toyotomi Kogyo Co., Ltd.: *See*—
Nakamura, Kazuharu, 290,391, Cl. D23-123.000.
Tristan, George. Support for displaying and dispensing roll carpeting. 290,317, 6-16-87, Cl. D6-409.000.
Tsubaki, Hiroyuki: *See*—
Inoue, Chuichi; Tsubaki, Hiroyuki; Kawata, Yoshiaki; and Uematsu, Toyoyuki, 290,359, Cl. D14-80.000.
Tsunetsugu, Toru: *See*—
Kawano, Kazuhiko; and Tsunetsugu, Toru, 290,353, Cl. D14-52.000.
Uematsu, Toyoyuki: *See*—
Inoue, Chuichi; Tsubaki, Hiroyuki; Kawata, Yoshiaki; and Uematsu, Toyoyuki, 290,359, Cl. D14-80.000.
Uke, Alan K. Closure handle for a diver's bag. 290,310, 6-16-87, Cl. D3-54.000.
U.S. Philips Corporation: *See*—
Brandsma, Sies K.; and Schouten, Henderikus P., 290,358, Cl. D14-73.000.
Fisher, Kim J., 290,356, Cl. D14-68.000.
Schouten, Henderikus P., 290,357, Cl. D14-73.000.
Unoki, Katsuhiro: *See*—
Gendron, William T.; Rapp, William J.; Green, Frederic L.; Unoki, Katsuhiro; and Gaskins, Robert J., 290,408, Cl. D26-67.000.
Gendron, William T.; Rapp, William J.; Green, Frederic L.; Unoki, Katsuhiro; and Gaskins, Robert J., 290,409, Cl. D26-67.000.
USV Pharmaceutical Corp.: *See*—
Downs, Stephen C., 290,412, Cl. D28-2.000.
Van Camp, Raymond E.: *See*—
Foley, Henry L.; and Van Camp, Raymond E., 290,332, Cl. D7-373.000.
Vining, Harrison F. S.: *See*—
Slayer, Peter D.; and Vining, Harrison F. S., 290,371, Cl. D17-99.000.
Vogtherr, Burkhard, to Klober GmbH & Co. Armrest for a chair. 290,321, 6-16-87, Cl. D6-500.000.
Vorwerk & Co. Elektrowerke KG.: *See*—
Strohmeyer, Rolf, 290,418, Cl. D32-32.000.
Strohmeyer, Rolf, 290,419, Cl. D32-32.000.
Wang, Lih-Po. Combined toothbrush and dental floss holder. 290,312, 6-16-87, Cl. D4-108.000.
Weernink, Johannes H., to Mepal Service B.V. Cup with lid. 290,323, 6-16-87, Cl. D7-6.000.
Welch, Marilyn L. Saddle bag for an umbrella stroller. 290,309, 6-16-87, Cl. D3-41.000.
Westvaco Corporation: *See*—
Osborne, Edward L., 290,343, Cl. D9-418.000.
Wilkinson, Ronald E., to Teledyne Industries, Inc. Water-cooled engine cylinder. 290,364, 6-16-87, Cl. D15-5.000.
Wisber, Barbara K., to Ladie and Friends, Inc. Doll body. 290,381, 6-16-87, Cl. D21-154.000.
Womack, Charles E. Disposable surgical boot. 290,303, 6-16-87, Cl. D2-272.000.
Wood, John M.; McGuire, Gary D.; and Wright, Doyle E. Portable sign. 290,377, 6-16-87, Cl. D20-10.000.
Wright, Doyle E.: *See*—
Wood, John M.; McGuire, Gary D.; and Wright, Doyle E., 290,377, Cl. D20-10.000.
Yahav, Shimon: *See*—
Daar, Yair; and Yahav, Shimon, 290,398, Cl. D24-26.000.
Yost, Holly K., to Price Pfister, Inc. Shower handle set. 290,388, 6-16-87, Cl. D23-29.000.
Yubisui, Takahisa; Sakaguchi, Hiroshi; and Iida, Katsuhiro, to Sharp Corporation. Electronic calculator. 290,372, 6-16-87, Cl. D18-7.000.
Yubisui, Takahisa; and Sakaguchi, Hiroshi, to Sharp Corporation. Electronic calculator. 290,373, 6-16-87, Cl. D18-7.000.
Yubisui, Takahisa; and Satake, Noriko, to Sharp Corporation. Electronic printing calculator. 290,374, 6-16-87, Cl. D18-7.000.
Yuen, John S., to John Manufacturing Limited. Combined multi-purpose lantern and adjustable stand therefor. 290,407, 6-16-87, Cl. D26-42.000.
Ziggity Systems, Inc.: *See*—
Hostetler, Eldon, 290,413, Cl. D30-14.000.
Zimmer, Inc.: *See*—
Kitchens, David G., 290,399, Cl. D24-26.000.
Zwicker Knitting Mills: *See*—
Pranica, Rebecca W., 290,305, Cl. D2-621.000.

CLASSIFICATION OF PATENTS

ISSUED JUNE 16, 1987

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 4

415	4,672,689
423	4,672,690
499	4,672,691
543	4,672,692
555	4,672,693
607	4,672,694

CLASS 5

2 R	4,672,695
17	4,672,696
62	4,672,697
424	4,672,698
430	4,672,699
441	4,672,700
450	4,672,701
497	4,672,702
503	4,672,703

CLASS 6

10	4,672,704

CLASS 8

151	4,672,705
528	4,673,410

CLASS 15

167 R	4,672,706
222	4,672,707
250 B	4,672,708
250.27	4,672,709
302	4,672,710
306 A	4,672,711

CLASS 16

91	4,672,712
197	4,672,713
262	4,672,714
334	4,672,715

CLASS 17

26	4,672,716

CLASS 19

225	4,672,717

CLASS 24

90 A	4,672,718
113 R	4,672,719
163 R	4,672,720
442	4,672,721
446	4,672,722
587	4,672,723
616	4,672,724
625	4,672,725

CLASS 29

33 A	4,672,726
156.8 B	4,672,727
157 R	4,672,728
159.2	4,672,729
241	4,672,730
259	4,672,731
429	4,672,732
511	4,672,733
517	4,672,734
564.6	4,672,735
569 L	4,672,736
572	4,672,737
576 B	4,672,738
589	4,672,739
590	4,672,740
726	4,672,741
840	4,672,742

CLASS 30

153	4,672,743
276	4,672,744
340	4,672,745
391	4,672,746

CLASS 33

1 K	4,672,747
11	4,672,748
18.3	4,672,749
178 F	4,673,890
199 R	4,672,750
286	4,672,751
302	4,672,752
366	4,672,753

CLASS 36

85	4,672,754
117	4,672,755

CLASS 37

55	4,672,756

CLASS 40

10 R	4,672,757
152.1	4,672,758
450	4,672,759

CLASS 42

50	4,672,760
51	4,672,761
70.01	4,672,762
70.11	4,672,763

CLASS 43

4	4,672,764
17.5	4,672,765
17.6	4,672,766
41.2	4,672,767
42.09	4,672,768
43.11	4,672,769
58	4,672,770

CLASS 44

53	4,673,411
68	4,673,412

CLASS 48

105	4,673,413

CLASS 49

253	4,672,772
352	4,672,771
358	4,672,773
371	4,672,774

CLASS 51

5 R	4,672,775
50 R	4,672,776
128	4,672,777
241 VS	4,672,786
293	4,673,414
354	4,672,778

CLASS 52

79.4	4,672,779
82	4,672,780
94	4,672,781
218	4,672,782
224	4,672,783
235	4,672,784
241	4,672,785
409	4,672,787
514	4,672,788
520	4,672,789
521	4,672,790

CLASS 53

327	4,672,791
374	4,672,792
434	4,672,793
440	4,672,794
446	4,672,795
449	4,672,796
467	4,672,797

CLASS 55

21	4,673,415
137	4,673,416
148	4,673,417
158	4,673,418
163	4,673,419
179	4,673,420
238	4,673,421
248	4,673,422
319	4,673,423
356	4,673,424
435	4,673,425
457	4,673,426

CLASS 56

12.7	4,672,798
17.4	4,672,799

CLASS 57

5	4,672,800
86	4,672,801
263	4,672,802
401	4,672,803
	4,672,804

CLASS 59

78.1	4,672,805

CLASS 60

39.03	4,672,806
222	4,672,807
286	4,672,808
	4,672,809
332	4,672,810
449	4,672,811
547.1	4,672,812
595	4,672,813
602	4,672,814

CLASS 62

180	4,672,816
183	4,672,817
239	4,672,818
298	4,672,819
304	4,672,820
324.2	4,672,821
468	4,672,822
514 R	4,672,823

CLASS 65

2	4,673,427
	4,673,428

CLASS 66

146	4,672,824
194	4,672,825

CLASS 70

278	4,672,826
367	4,672,827
373	4,672,828
472	4,672,829

CLASS 71

27	4,673,429

CLASS 72

8	4,672,830
21	4,672,831
62	4,672,832
111	4,672,833
325	4,672,834
389	4,672,835
479	4,672,836

CLASS 73

1 R	4,672,837
9	4,672,838
35	4,672,839
38	4,672,840
	4,672,841
49.2	4,672,842
117.3	4,672,843
118.1	4,672,844
151	4,672,845
180	4,672,846
204	4,672,847
505	4,672,848
579	4,672,849
593	4,672,850
597	4,672,851
622	4,672,852
708	4,672,853
861.33	4,672,854
862.04	4,672,855
863.52	4,672,856
864.18	4,672,857

CLASS 74

424.8 R	4,672,858
479	4,672,859
512	4,672,860
665 GE	4,672,861
843	4,672,862
866	4,672,863
	4,672,864

CLASS 75

0.5 AA	4,673,430
25	4,673,431
38	4,673,432
53	4,673,433
61	4,673,434
235	4,673,435

CLASS 81

9.4	4,672,865
57.37	4,672,866
176.1	4,672,867

CLASS 82

2 E	4,672,868
2.5	4,672,869

CLASS 83

19	4,672,870
151	4,672,871
171	4,672,872
200.1	4,672,873
881	4,672,874

CLASS 84

1.01	4,672,875
1.03	4,672,876
299	4,672,877
384	4,672,878

CLASS 87

7	4,672,879

CLASS 89

1.816	4,672,881
12	4,672,880

CLASS 91

369 A	4,672,882
	4,672,883
375 R	4,672,884
450	4,672,885

CLASS 98

2.09	4,672,886
29	4,672,888
31.6	4,672,887
42.2	4,672,889
114	4,672,890

CLASS 0 V

339 F	4,673,252

CLASS 101

32	4,672,891
35	4,672,892
170	4,672,893
348	4,672,894

CLASS 102

206	4,672,895
309	4,672,896
513	4,672,897

CLASS 106

14.13	4,673,436
97	4,673,437
98	4,673,659
126	4,673,438
287.24	4,673,439

CLASS 108

6	4,672,898

CLASS 110

234	4,672,899
264	4,672,900

CLASS 111

2	4,672,901

CLASS 112

287	4,672,902
457	4,672,903
	4,672,904

CLASS 114

56	4,672,905
74 A	4,672,906
103	4,672,907
214	4,672,908
218	4,672,909
361	4,672,910
363	4,672,911

CLASS 118

64	4,672,912
124	4,672,915
623	4,672,913
641	4,672,914

CLASS 119

52 AF	4,672,917
52 B	4,672,916

CLASS 122

4 D	4,672,918
13 R	4,672,919

CLASS 123

41.15	4,672,920
41.38	4,672,921
41.66	4,672,922
41.74	4,672,923
65 PE	4,672,924
	4,672,925
90.34	4,672,926
90.44	4,672,927
143 B	4,672,928
179 G	4,672,929
182	4,672,930
193 P	4,672,931
196 A	4,672,932
239	4,672,936
270	4,672,933
339	4,672,934
	4,672,935
509	4,672,937
538	4,672,938
568	4,672,939
590	4,672,940
602	4,672,941

CLASS 124

1	4,672,942
23 R	4,672,943
35 A	4,672,945

CLASS 126

25 R	4,672,944
77	4,672,946
163 R	4,672,947
438	4,672,948
440	4,672,949
452	4,672,950

CLASS 128

1.5	4,672,951
33	4,672,952
66	4,672,953
79	4,672,954
80 F	4,672,955
90	4,672,956
92 VD	4,672,957
134	4,672,958
136	4,672,959
200.26	4,672,960
303.1	4,672,961
	4,672,962
	4,672,963
305	4,672,964
	4,672,965
330	4,672,966
	4,672,967
380	4,672,968
397	4,672,969
635	4,672,970
	4,672,971
653	4,672,972
665	4,672,973
673	4,672,974
715	4,672,975
	4,672,976
	4,672,977
782	4,672,978
784	4,672,979
804	4,672,980

CLASS 130

27 R	4,672,981

CLASS 131

290	4,672,982

CLASS 132

7	4,672,983
90	4,672,986

CLASS 134

8	4,673,440
18	4,673,441
24	4,673,442
25.4	4,673,443
56 R	4,672,984
57 R	4,672,985
138	4,672,987
167 C	4,672,988

CLASS 136

259	4,673,770

CLASS 137

1	4,672,989
59	4,672,990
218	4,672,991
322	4,672,993
331	4,672,992
359	4,672,994
489	4,672,995
522	4,672,996
554	4,672,997
614.04	4,672,998
625.4	4,672,999
860	4,673,000

CLASS 138

93	4,673,001
149	4,673,002

CLASS 139

342	4,673,003
435	4,673,004
	4,673,005

CLASS 141

1	4,673,006
95	4,673,007
198	4,673,008
	4,673,009
382	4,673,010

CLASS 144

136 B	4,673,011
208 E	4,673,012
341	4,673,013

CLASS 148

6.15 R	4,673,445
6.15 Z	4,673,444
33	4,673,446
156	4,673,447

CLASS 152

	4,673,014
231	4,673,015

CLASS 156

73.1	4,673,448
94	4,673,449
153	4,673,450
172	4,673,451
254	4,673,452
256	4,673,453
281	4,673,454
294	4,673,455
345	4,673,456
415	4,673,457
659.1	4,673,458

CLASS 157

1.24	4,673,016

CLASS 159

13.1	4,673,459

CLASS 160

22	4,673,017
84 R	4,673,018
268 R	4,673,019

CLASS 162

75	4,673,460
205	4,673,461
301	4,673,462

CLASS 164

40	4,673,020
122	4,673,021
201	4,673,022
246	4,673,023
431	4,673,024
457	4,673,025

CLASS 165

9	4,673,026
11.2	4,673,027
19	4,673,028
22	4,673,029
32	4,673,030
39	4,673,031
44	4,673,032

CLASS 166

55.1	4,673,033
75.1	4,673,034
77	4,673,035
117.5	4,673,036
249	4,673,037
270	4,673,038

281 4,673,039
305.1 4,673,040
340 4,673,041

CLASS 173

40 B1 3,500,938
134 4,673,042
162 H 4,673,043

CLASS 174

38 4,673,771
52 FP 4,673,772
68.5 4,673,773
94 R 4,673,774
130 4,673,775

CLASS 175

329 4,673,044
339 4,673,045

CLASS 177

1 4,673,046
136 4,673,047
146 4,673,048
209 4,673,049

CLASS 180

9.1 4,673,050
132 4,673,051
219 4,673,052
227 4,673,053
271 4,673,054
336 4,673,055

CLASS 181

141 4,673,056
144 4,673,057
266 4,673,058

CLASS 182

3 4,673,059
82 4,673,060
202 4,673,061

CLASS 187

100 4,673,911
134 4,673,062

CLASS 188

1.11 4,673,063
18 A 4,673,064
73.38 4,673,065
119 4,673,066
299 4,673,067
315 4,673,068
331 4,673,069

CLASS 190

108 4,673,070

CLASS 192

3.21 4,673,071
3.57 4,673,072
35 4,673,073

CLASS 194

236 4,673,074

CLASS 198

339.1 4,673,075
346.2 4,673,076
393 4,673,077
450 4,673,078
599 4,673,079
689.1 4,673,080

CLASS 200

43.08 4,673,776
61.45 R 4,673,777
67 B 4,673,778
144 B Re.32,440
146 R 4,673,779
302.2 4,673,780

CLASS 201

41 4,673,463

CLASS 202

158 4,673,464

CLASS 203

51 4,673,465
4,673,466

CLASS 204

23 4,673,467
24 4,673,468
38.4 4,673,469
44.4 4,673,470
44.5 4,673,471
44.6 4,673,472
59 R 4,673,473
157.64 4,673,474
192.11 4,673,475
192.28 4,673,476
192.38 4,673,477
243 R 4,673,478
4,673,481
279 4,673,479
298 4,673,480
4,673,482
301 4,673,483

CLASS 206

223 4,673,081
315.6 4,673,082
387 4,673,083
438 4,673,084
459 4,673,085
538 4,673,086
600 4,673,087

CLASS 208

58 4,673,487
86 4,673,485
4,673,486
101 4,673,488
289 4,673,489
354 4,673,490
435 4,673,484

CLASS 209

453 4,673,491
477 4,673,492

CLASS 210

98 4,673,493
202 4,673,494
232 4,673,495
4,673,496
242.3 4,673,497
275 4,673,498
295 4,673,499
307 4,673,500
406 4,673,501
413 4,673,502
493.1 4,673,503
500.22 4,673,504
611 4,673,505
636 4,673,506
681 4,673,507
698 4,673,508
699 4,673,509
712 4,673,510
734 4,673,511
748 4,673,512
756 4,673,513
783 4,673,514

CLASS 211

70.5 4,673,088
71 4,673,089
183 4,673,090
184 4,673,091
188 4,673,092

CLASS 212

175 4,673,093

CLASS 215

10 4,673,094
220 4,673,095
230 4,673,096

CLASS 219

10.49 R 4,673,781
10.55 F 4,673,783
10.55 M 4,673,782
10.57 4,673,784
4,673,785
56 4,673,786
69 M 4,673,791
69 W 4,673,787
4,673,788
4,673,789
4,673,790
74 4,673,792
86.1 4,673,793
121 ED 4,673,794
121 L 4,673,795
145.22 4,673,796
203 4,673,797
225 4,673,798
399 4,673,799
518 4,673,800
544 4,673,801

CLASS 220

3.5 4,673,097
88 A 4,673,098
269 4,673,099
324 4,673,100
335 4,673,101
457 4,673,102

CLASS 221

186 4,673,103
261 4,673,104
281 4,673,105

CLASS 222

80 4,673,106
94 4,673,107
144.5 4,673,108
153 4,673,109
211 4,673,110
305 4,673,111
386.5 4,673,112

CLASS 223

15 4,673,113
89 4,673,114
94 4,673,115
4,673,116

CLASS 224

151 4,673,117
259 4,673,118
326 4,673,119

CLASS 227

67 4,673,120

CLASS 228

119 4,673,122
148 4,673,121
170 4,673,124
263.13 4,673,123

CLASS 229

17 B 4,673,125
43 4,673,126

CLASS 235

379 4,673,802
436 4,673,803
463 4,673,804
472 4,673,805

CLASS 236

51 4,673,127

CLASS 239

1 4,673,128
167 4,673,130
532 4,673,129
673 4,673,131
706 4,673,132

CLASS 241

19 4,673,133
57 4,673,134
82.1 4,673,135
280 4,673,136

CLASS 242

35.5 R 4,673,138
47.01 4,673,139
54 R 4,673,140
55.1 4,673,137
58.3 4,673,142
75.47 4,673,141
96 4,673,143
107.4 C 4,673,144
198 4,673,145

CLASS 244

3.23 4,673,146
122 A 4,673,147

CLASS 248

73 4,673,150
74.1 4,673,151
216.1 4,673,152
231.8 4,673,153
293 4,673,148
320 4,673,154
343 4,673,155
404 4,673,155
559 4,673,156

CLASS 249

13 4,673,157
144 4,673,158
159 4,673,159

CLASS 250

201 4,673,806
214 AG 4,673,807
231 SE 4,673,808
4,673,809
4,673,810
235 4,673,811
252.1 4,673,812
506.1 4,673,813
4,673,814
548 4,673,815
556 4,673,816
561 4,673,817
571 4,673,818
573 4,673,819
4,673,820
578 4,673,821

CLASS 251

10 4,673,161
30.01 4,673,162
129.05 4,673,160
129.1 4,673,163
174 4,673,164

CLASS 252

12 4,673,515
49.5 4,673,516
67 4,673,517
70 4,673,519
4,673,520
75 4,673,518
79.3 4,673,521
87 4,673,522
91 4,673,523
118 4,673,524
132 4,673,525
174.16 4,673,526
181 4,673,527
188.25 4,673,528
299.63 4,673,529
398 4,673,530
512 4,673,531
4,673,532
522 R 4,673,533

CLASS 254

132 4,673,165

CLASS 256

11 4,673,166

CLASS 260

501.12 4,673,534
501.15 4,673,535

CLASS 261

78.1 4,673,536
97 4,673,537
112 4,673,538

CLASS 264

1.1 4,673,539
1.5 4,673,540
25 4,673,541
46.7 4,673,542
82 4,673,543

CLASS 266

281 4,673,167

CLASS 267

8 R 4,673,171
64.11 4,673,172
64.27 4,673,168
140.1 4,673,169
174 4,673,170

CLASS 269

32 4,673,173
41 4,673,174

CLASS 271

10 4,673,175
186 4,673,176

CLASS 272

73 4,673,177
4,673,178
93 4,673,179
146 4,673,180

CLASS 273

1 GC 4,673,181
110 4,673,182
176 A 4,673,183
286 4,673,184
294 4,673,185
399 4,673,186

CLASS 277

26 4,673,187
34 Re.32,438
212 FB 4,673,188

CLASS 280

91 4,673,189
289 G 4,673,190
408 4,673,191
668 4,673,192
707 4,673,193
4,673,194
801 4,673,195
825 4,673,196

CLASS 283

34 4,673,197

CLASS 285

292 4,673,198
316 4,673,199
319 4,673,200
333 4,673,201

CLASS 290

44 4,673,822

CLASS 292

162 4,673,202
339 4,673,203
346 4,673,204

CLASS 293

132 4,673,205

CLASS 296

1 S 4,673,206
39 R 4,673,207
98 4,673,208
100 4,673,209
221 4,673,210

CLASS 297

16 4,673,211
195 4,673,212
284 4,673,213
408 4,673,214
452 4,673,215
4,673,216
473 4,673,217

CLASS 299

15 4,673,218
39 4,673,219

CLASS 303

6 C 4,673,220
6 R 4,673,221
9 4,673,222
24 C 4,673,223
56 4,673,224
100 4,673,225
109 4,673,226

CLASS 307

11 4,673,823
64 4,673,824
66 4,673,825
4,673,826
116 4,673,827
139 4,673,828
296 A 4,673,829
297 4,673,830
300 4,673,831
326 4,673,832

CLASS 310

29 4,673,833
71 4,673,834
217 4,673,835
239 4,673,836
4,673,837
4,673,838
338 4,673,839

CLASS 312

100 4,673,227

CLASS 313

25 4,673,840
35 4,673,841
292 4,673,842
570 4,673,843

CLASS 315

200 R 4,673,844
241 P 4,673,845
248 4,673,846
368 4,673,847

CLASS 318

266 4,673,848
272 4,673,849
305 4,673,850
341 4,673,851
4,673,852
443 4,673,853
649 4,673,854
696 4,673,855
4,673,856
4,673,857
805 4,673,858
810 4,673,859
812 4,673,860

CLASS 320

2 4,673,861
64 4,673,862

CLASS 322

2 R 4,673,863

CLASS 323

221 4,673,864
222 4,673,865
313 4,673,866
315 4,673,867

CLASS 324

51 4,673,868
61 R 4,673,869
74 4,673,870
76 R 4,673,871
103 R 4,673,872
137 4,673,873
4,673,874
207 4,673,875
208 4,673,876
225 4,673,877
226 4,673,878
240 4,673,879
309 4,673,880
318 4,673,881
320 4,673,882
384 4,673,883
407 4,673,884
457 4,673,885

CLASS 330

10 4,673,887
4,673,888
4,673,889
298 4,673,886

CLASS 331

2 4,673,891
14 4,673,892
64 4,673,893
96 4,673,894
99 4,673,895

CLASS 333

13 4,673,896
26 4,673,897
109 4,673,898
137 4,673,899
167 4,673,900
196 4,673,901
202 4,673,902
210 4,673,903
238 4,673,904
239 4,673,905

CLASS 335

79 4,673,908
210 4,673,906

CLASS 336

92 4,673,907

CLASS 337

407 4,673,909

CLASS 338

35 4,673,910

CLASS 340

52 R 4,673,912
4,673,913
64 4,673,914
330 4,673,915
347 CC 4,673,917
347 SH 4,673,916
365 A 4,673,919
365 P 4,673,918
521 4,673,920
539 4,673,921
572 4,673,922
4,673,923
601 4,673,924
603 4,673,925
605 4,673,926
621 4,673,927
638 4,673,928
703 4,673,929
4,673,930
722 4,673,931
825.54 4,673,932
825.94 4,673,933

CLASS 342

8 4,673,934
27 4,673,935
51 4,673,936
72 4,673,937
95 4,673,938
174 4,673,939
192 4,673,940
201 4,673,941
367 4,673,943
368 4,673,942
424 4,673,944

CLASS 343

755 4,673,945
776 4,673,946
781 CA 4,673,947
792.5 4,673,948
825 4,673,949
912 4,673,950

CLASS 346

75 4,673,951
76 PH 4,673,952
108 4,673,953
139 R 4,673,954
140 R 4,673,955
160 4,673,956

CLASS 350

3.64 4,673,241
96.15 4,673,243
4,673,270
96.20 4,673,242
4,673,244
4,673,245
96.22 4,673,246
96.23 4,673,247
166 4,673,248
287 4,673,249
320 4,673,250
339 F 4,673,253
345 4,673,254
347 V 4,673,255

350 S 4,673,256
354 4,673,257
427 4,673,258
465 4,673,259
516 4,673,260
531 4,673,261
538 4,673,262

CLASS 351

158 4,673,263
211 4,673,264
217 4,673,265

CLASS 352

90 4,673,266
242 4,673,267
243 4,673,268

CLASS 354

76 4,673,269
152 4,673,271
173.11 4,673,272
322 4,673,251
4,673,273
403 4,673,274
412 4,673,275
430 4,673,276
474 4,673,277
479 4,673,278

CLASS 355

3 CH 4,673,280
3 SH 4,673,279
14 E 4,673,282
14 R 4,673,281
14 SH 4,673,283
15 4,673,284
23 4,673,285
25 4,673,286

CLASS 356

4 4,673,287
72 4,673,288
4,673,289
73.1 4,673,290
4,673,291
334 4,673,292
350 4,673,293
381 4,673,294
440 4,673,295

CLASS 357

2 4,673,957
13 4,673,958
22 4,673,959
4,673,960
4,673,961
23.6 4,673,962
24 4,673,963
27 4,673,964
43 4,673,965
68 4,673,966
70 4,673,967
71 4,673,968
4,673,969

CLASS 358

10 4,673,976
27 4,673,970
75 4,673,971
77 4,673,972
93 4,673,973
108 4,673,974
133 4,673,977
140 4,673,978
142 4,673,979
149 4,673,980
160 4,673,981
167 4,673,982
183 4,673,983
190 4,673,984
213.12 4,673,985
242 4,673,986
260 4,673,987
280 4,673,988
287 4,673,989
296 4,673,990

CLASS 360

14.1 4,673,991
15 4,673,992
79 4,673,993
85 4,673,994
93 4,673,995
103 4,673,996
107 4,673,997
113 4,673,998
125 4,673,999
128 4,674,000
137 4,674,001

CLASS 361

66 4,674,002
235 4,674,003
384 4,674,004
388 4,674,005
393 4,674,006
404 4,674,007
417 4,674,008
433 4,674,009
4,674,010

CLASS 362

32 4,674,011
61 4,674,012
66 4,674,013
80 4,674,014
217 4,674,015
240 4,674,016
349 4,674,017
424 4,674,018

CLASS 363

20 4,674,019
21 4,674,020
56 4,674,021
57 4,674,022
4,674,023
71 4,674,024
4,674,025
160 4,674,026

CLASS 364

143 4,674,027
148 4,674,028
4,674,029
184 4,674,030
4,674,031
200 4,674,032
4,674,033
4,674,034
4,674,035
4,674,036
4,674,037
4,674,038
300 4,674,039
4,674,040
401 4,674,041
4,674,042
4,674,043
408 4,674,044
414 4,674,045
4,674,046
423 4,674,047
424 4,674,048
426 4,674,049
4,674,050
443 4,674,051
466 4,674,052
476 4,674,053
477 4,674,054
479 4,674,055
483 4,674,056
513 4,674,057
518 4,674,058
523 4,674,059
567 4,674,060
571 4,674,061
602 4,674,062
900 4,674,063
4,674,064
4,674,065
4,674,066

CLASS 366

159 4,673,296
208 4,673,297

CLASS 367

25 4,674,067
77 4,674,068
90 4,674,069
105 4,674,073
172 4,674,074
173 4,674,075

CLASS 369

32 4,674,076
37 4,674,077
44 4,674,078
46 4,674,070
48 4,674,071
52 4,674,072
77.1 4,674,079
77.2 4,674,080
275 4,674,081

CLASS 370

60 4,674,082
67 4,674,083
85 4,674,084
4,674,085
86 4,674,086
100 4,674,087
4,674,088

CLASS 371

25 4,674,089
4,674,090

CLASS 372

20 4,674,091
33 4,674,092
38 4,674,093
45 4,674,094
50 4,674,095
4,674,096
54 4,674,097
59 4,674,098
4,674,099
96 4,674,100

CLASS 373

95 4,674,101
98 4,674,102

CLASS 374

122 4,673,298
131 4,673,299
182 4,673,300

CLASS 375

13 4,674,103
37 4,674,104
80 4,674,105

CLASS 376

261 4,673,544
4,673,545
289 4,673,546
314 4,673,547
362 4,673,548

CLASS 377

82 4,674,106

CLASS 378

98 4,674,107
99 4,674,108
130 4,674,109
208 4,674,110

CLASS 379

58 4,674,111
96 4,674,112
107 4,674,113
154 4,674,114
201 4,674,115
211 4,674,116
377 4,674,117
393 4,674,118
400 4,674,119
427 4,674,120

CLASS 380

14 4,673,975

CLASS 381

10 4,674,121
13 4,674,122
60 4,674,123
73.1 4,674,124

CLASS 382

49 4,674,125
53 4,674,126

CLASS 383

6 4,674,127
10 4,674,128
119 4,674,129

CLASS 384

428 4,673,301
548 4,673,302

CLASS 400

126 4,673,303
208 4,673,304
460 4,673,305
618 4,673,306

CLASS 401

289 4,673,307

CLASS 403

172 4,673,308
265 4,673,309

CLASS 404

26 4,673,310
112 4,673,311

CLASS 405

184 4,673,312
195 4,673,313
215 4,673,314
230 4,673,315
267 4,673,316

CLASS 407

28 4,673,317

CLASS 408

9 4,673,318

CLASS 409

234 4,673,319

CLASS 411

21 4,673,320
40 4,673,321
4,673,322
387 4,673,323

CLASS 412

6 4,673,324

CLASS 414

103 4,673,325
286 4,673,326
408 4,673,327
471 4,673,328
744 A 4,673,329

CLASS 415

1 4,673,330
53 R 4,673,331
113 4,673,332
213 T 4,673,333

CLASS 417

53 4,673,334
54 4,673,335
239 4,673,336
273 4,673,337
435 4,673,338

CLASS 418

15 4,673,339
4,673,340
26 4,673,341
150 4,673,342
173 4,673,343
201 4,673,344

CLASS 419

10 4,673,549
12 4,673,550

CLASS 420

535 4,673,551

CLASS 422

140 4,673,552
180 4,673,553

CLASS 423

63 4,673,554
167 4,673,555
213.5 4,673,556
230 4,673,557
240 4,673,558
306 4,673,559
532 4,673,560
559 4,673,561

CLASS 424

1.1 4,673,562
9 4,673,563
19 4,673,566
38 4,673,567
47 4,673,568
4,673,569
66 4,673,570
70 4,673,571
89 4,673,572
92 4,673,574
94.63 4,673,573
195.1 4,673,575
443 4,673,565
494 4,673,564

CLASS 425

174.8 R 4,673,345
458 4,673,346
538 4,673,347

CLASS 426

2 4,673,576
5 4,673,577
93 4,673,578
321 4,673,579
385 4,673,580
531 4,673,581
548 4,673,582
573 4,673,583

CLASS 427

2 4,673,584
6 4,673,585
38 4,673,586
4,673,587
41 4,673,588
4,673,589
44 4,673,590
48 4,673,591
53.1 4,673,592
89 4,673,593
196 4,673,594
213.32 4,673,595
262 4,673,596
374.4 4,673,597
412 4,673,598

CLASS 428

10 4,673,599
12 4,673,600
35 4,673,601
65 4,673,602
85 4,673,603
95 4,673,604
120 4,673,605
138 4,673,606
172 4,673,607
182 4,673,608
187 4,673,609
213 4,673,610
215 4,673,611
216 4,673,612
247 4,673,613
285 4,673,614
286 4,673,615
289 4,673,616
323 4,673,617
336 4,673,618
338 4,673,619
379 4,673,620
420 4,673,621
423.1 4,673,622
620 4,673,623

CLASS 429

41 4,673,624
187 4,673,625

CLASS 430

14 4,673,626
49 4,673,627
58 4,673,628
4,673,629
72 4,673,630
110 4,673,631
510 4,673,632

CLASS 431

115 4,673,348
328 4,673,349
353 4,673,350

CLASS 433

29 4,673,351
69 4,673,352
90 4,673,353
217.1 4,673,354
218 4,673,355

CLASS 434

35 4,673,356
311 4,673,357

CLASS 435

4 4,673,633
5 4,673,634
10 4,673,635
34 4,673,636
4,673,637
4,673,638
36 4,673,639
68 4,673,640
4,673,641
91 4,673,642
97 4,673,643
101 4,673,644
119 4,673,645
146 4,673,646
189 4,673,647
240 4,673,648
4,673,649
286 4,673,650
301 4,673,651

CLASS 436

2 4,673,652
8 4,673,653
66 4,673,654
75 4,673,655
173 4,673,656
501 4,673,657

CLASS 439

21 4,673,228
133 4,673,230
207 4,673,229
404 Re.32,439
441 4,673,232
442 4,673,233
469 4,673,234
536 4,673,235
587 4,673,231
607 4,673,237
609 4,673,236
746 4,673,239
755 4,673,240
890 4,673,238

CLASS 440

61 4,673,358
88 4,673,359
4,673,360
101 4,673,361
112 4,673,362

CLASS 441

1 4,673,363
59 4,673,364
70 4,673,365
90 4,673,366

CLASS 446

4 4,673,367
8 4,673,368
133 4,673,369
162 4,673,370
175 4,673,371
239 4,673,372
378 4,673,373
383 4,673,374

CLASS 464

145 4,673,375
158 4,673,376

CLASS 474

1 4,673,377
18 4,673,378
28 4,673,379
90 4,673,380

CLASS 493

128 4,673,381
359 4,673,382
381 4,673,383

CLASS 501

89 4,673,658
135 4,673,660

CLASS 502

111 4,673,661
115 4,673,662
320 4,673,663
439 4,673,664

CLASS 514

15 4,673,665
23 4,673,666
25 4,673,667
34 4,673,668
42 4,673,669
46 4,673,670
80 4,673,671
95 4,673,672
178 4,673,673
220 4,673,674
252 4,673,675
267 4,673,676
272 4,673,677
278 4,673,678
282 4,673,679
285 4,673,680
288 4,673,681
307 4,673,682
317 4,673,683
327 4,673,684
333 4,673,685
359 4,673,686
460 4,673,687
554 4,673,688
561 4,673,689
563 4,673,690
567 4,673,691
583 4,673,692

CLASS 518

713 4,673,693

CLASS 521

59 4,673,694
64 4,673,695
172 4,673,696

CLASS 523

218 4,673,697

CLASS 524

47 4,673,698
94 4,673,699
96 4,673,700
99 4,673,701
459 4,673,702
504 4,673,703
519 4,673,704
850 4,673,705

CLASS 525

31 4,673,706
54.2 4,673,707
66 4,673,708
99 4,673,709
111.5 4,673,710
240 4,673,711
278 4,673,713
314 4,673,714
340 4,673,715
367 4,673,716
390 4,673,717
476 4,673,718

CLASS 526

125 4,673,719
253 4,673,712
285 4,673,720
329.3 4,673,721

CLASS 528

73 4,673,722
113 4,673,723

CLASSIFICATION OF PATENTS

206 4,673,724
266 4,673,725
288 4,673,726
295.5 4,673,727
339 4,673,728
397 4,673,729
491 4,673,730
503 4,673,731

CLASS 530

326 4,673,732
344 4,673,733
364 4,673,734

CLASS 534

606 4,673,735

CLASS 536

7.2 4,673,736

CLASS 540

205 4,673,737
222 4,673,738
355 4,673,739

CLASS 544

92 4,673,740
209 4,673,741
251 4,673,742
275 4,673,743
385 4,673,744

CLASS 546

147 4,673,745
272 4,673,746
334 4,673,747

CLASS 548

237 4,673,748
490 4,673,749

CLASS 549

215 4,673,750
294 4,673,751
389 4,673,752

CLASS 556

15 4,673,753
137 4,673,754
489 4,673,755

CLASS 558

416 4,673,756
431 4,673,757

CLASS 560

90 4,673,758
122 4,673,759
124 4,673,760

CLASS 562

459 4,673,761

CLASS 564

155 4,673,763
4,673,764
4,673,765
497 4,673,762

CLASS 568

433 4,673,766

CLASS 585

458 4,673,769
467 4,673,767
519 4,673,768

CLASS 604

10 4,673,384
28 4,673,385
48 4,673,386
62 4,673,387
74 4,673,388
81 4,673,389
4,673,390
141 4,673,391
167 4,673,392
175 4,673,393
191 4,673,394
211 4,673,395
251 4,673,396
264 4,673,397
272 4,673,398
283 4,673,399
353 4,673,400
368 4,673,401
385 R 4,673,402
411 4,673,403
890 4,673,404
4,673,405

CLASS 623

6 4,673,406
20 4,673,407
4,673,408
23 4,673,409

CLASSIFICATION OF DESIGNS

D2— 40 290,300
215 290,301
267 290,302
272 290,303
617 290,304
621 290,305
630 290,306
D3— 12 290,307
30.1 290,308
41 290,309
54 290,310
101 290,311
D4— 108 290,312
D6— 300 290,313
320 290,314
337 290,315
406 290,316
409 290,317
486 290,318
488 290,319
491 290,320
500 290,321
508 290,322
D7— 6 290,323
9 290,324
290,325
17 290,326
28 290,327
42 290,328
49 290,329
306 290,330
372 290,331
373 290,332
D8— 99 290,333
105 290,334
308 290,335
290,336
316 290,337
350 290,338
354 290,339
D9— 358 290,340
384 290,341
405 290,342
418 290,343
424 290,344
431 290,345
438 290,346
D10— 38 290,347
112 290,348
D11— 218 290,349
D12— 155 290,350
300 290,351
D13— 28 290,352
D14— 52 290,353
60 290,354
62 290,355
68 290,356
73 290,357
290,358
80 290,359
100 290,360
111 290,361
113 290,362
290,363
D15— 5 290,364
10 290,365
17 290,366
69 290,367
290,368
133 290,369
D17— 1 290,370
99 290,371
D18— 7 290,372
290,373
290,374
D19— 26 290,375
32 290,376
D20— 10 290,377
290,378
D21— 33 290,379
72 290,380
154 290,381
191 290,382
D22— 118 290,383
142 290,384
290,385
D23— 3 290,386
25 290,387
29 290,388
290,389
69 290,390
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